

# **Everett HOV Design-Build Project**

## **Chapter 2 Technical Specifications**

**Conformed Document**

**May 16, 2005**

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Bridge

Drainage

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Vacant

Illumination

Signal

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## 2 TECHNICAL SPECIFICATIONS

### 2.1 GENERAL INFORMATION

#### 2.1.1 General Requirements

**Design-Build Flexibility.** The Department's intent is to permit flexibility in design and subsequent construction to accommodate processes, procedures, and innovative techniques that are preferred by the Design-Builder, as long as they are consistent with Site conditions, good engineering practices, and the standards, guidelines, and procedures identified in the Contract Documents.

**Other Agencies.** The Department has briefly reviewed the Project with the local agencies, public and private, and has incorporated some of those agencies' feedback into the Technical Specifications and in the various appendices. The Department does not guarantee that the agencies will not impose additional requirements with their review of the Design-Builder's Project design.

For any such additional requirements that are outside the requirements of the Contract, the Design-Builder is responsible for negotiating and coordinating the Work with the appropriate agency(ies).

##### 2.1.1.1 Document's Intent

Unless specifically addressed to be performed by others or by WSDOT, all Work described and listed in the Technical Specifications of the Request For Proposal is the responsibility of the Design-Builder to perform, deliver or construct.

#### 2.1.2 Units of Measurement

The Project shall be designed, constructed and documented in English Units of Measure.

#### 2.1.3 Purpose

The purpose of the Project is to construct highway improvements which in general scope are described in Interstate 5 Everett HOV, SR 526 to US 2 Vicinity issued September 2004 Project Environmental Assessment (EA) and modified in the 10 November 2004 FONSI. The general scope of the Work is also shown in RFP *Appendix H – Hydraulic Data*, RFP *Appendix L – Landscape and Aesthetics Report*, RFP *Appendix M – Conceptual Designs*, RFP *Appendix P – Environmental Permits and Approvals* and RFP *Appendix W – Wetlands Mitigation and other documents included in the RFP*.

#### 2.1.4 Description of Work

Design-Builder shall perform, design, furnish materials and construct all the necessary Work to deliver a complete Project, which meets or exceeds the following:

1. Provide and extend the existing I-5 Northbound and Southbound HOV lanes on I-5, from SR 526 vic. to East Marine View Drive.
2. I-5 Northbound Auxiliary lane from 41<sup>st</sup> St On-Ramp to US-2 Off-Ramp
3. I-5 Southbound Auxiliary lane from Marine View Drive to US-2 Off-Ramp, and from US-2 to Broadway On-Ramp.
4. Reconfigure existing northbound I-5 Off-Ramp at Broadway Avenue into a HOV-Only Southbound On-Ramp and Northbound Off-Ramp.
5. Construct new I-5 general-purpose 2-lane right-hand off-ramp to Broadway Avenue.
6. Reconstruct existing 41<sup>st</sup> St., Pacific Ave, US-2, Everett Ave. and Marine View Drive On and Off ramps to meet design requirements and provide ramp metering.
7. Provide HOV-By-Pass at ramp meters where no-additional Right of Way is required and in accordance with traffic analysis.
8. Provide stormwater treatment facilities that treat 100% of the existing and proposed impervious surface runoff within the Project limits and meets current regulations.
9. Provide environmental mitigation for the Project as described in the Project EA and Project Permit conditions
10. Meets or exceeds all of the Project permit requirements.
11. Overlay and reconstruct the superelevations and cross-slopes to meet standards within the Asphalt Pavement limits.
12. Other requirements described in the Contract.

#### **2.1.4.1 WSDOT Developed Project Conceptual Designs**

The Design-Builder shall develop the Project design so as to meet all the requirements of the Contract Documents. The Project Conceptual Design in RFP Appendix M was developed only to a limited level. If the Design-Builder adopts the Conceptual Design as the basis from which it will design the Project, the Design-Builder is responsible for:

1. Ensure that the resulting design meets the requirements of the Contract Documents.
2. Assume responsibility for any Project requirements arising from using the Conceptual Designs as the basis of the Project design and construction, subject to the Design-Builder's rights with respect to Necessary Basic Configuration Changes as specified in the General Provisions.

#### **2.1.4.2 Coordination with Other Projects**

The Design-Builder is responsible for coordination of the Work with other projects by WSDOT or others that could hinder the progress of the Design-Builder or affect the operation of the roadway in a manner other than as approved by WSDOT. This includes roadway closures not in the immediate area of the Project but that affect the operation of the roadway.

Several Projects that are known that could possibly occur within the same location or in the immediate vicinity or occur within the projected time for the Project are:

1. Sound Transit: I-5 South Everett Park & Ride / HOV Access – south of the Project
2. WSDOT: SR-529 Bridge Retrofit

3. WSDOT: Seismic Retrofit for Bridge 5/622S-S, Pier No's 1 to 4, Bridge 5/624, Pier No. 2 AD 07-11-2005
4. WSDOT: I-5 – 52<sup>nd</sup> Avenue West to SR-526 – SB Paving AD 02-06-2006
5. WSDOT: I-5 /SB Off-Ramp – SR-526 Safety Project AD 05-02-2005
6. WSDOT: I-5/SB On-Ramp from Broadway to CD Signalization AD 07-06-2009
7. WSDOT: I-5/Steamboat Slough Bridges 5/648E&W; Scour Repair AD 04-18-2005
8. WSDOT: I-5/SR-526 Interchange Unstable Slope Repair AD 05-04-2009
9. City of Everett: 41<sup>st</sup> Street Interchange Project
10. City of Everett: East Marine View Drive (EMVD) Improvement Project

### **2.1.5 Project Management Criteria**

Design-Builder shall manage the entire Project and coordinate all activities necessary to accomplish the requirements of the Contract Documents.

#### **2.1.5.1 Management**

Design-Builder shall achieve organizational performance that provides to the public a roadway system that incorporates Context Sensitive Solutions, meets the quality described herein at a fair cost, addresses the transportation need, and minimizes the Project impacts on the environment.

Design-Builder shall keep communications with the Department continually open to promote betterment opportunities. Continuously look for opportunities to improve efficiency, and at the same time, meet the goals and quality needs described in the Contract. Empower personnel at all organizational levels to meet these goals and their associated tasks.

#### **2.1.5.2 Key Personnel**

##### **Key Personnel Directory:**

Within seven calendar days of the Notice To Proceed the Design-Builder shall provide a comprehensive Project directory, including the names of the previously committed Key Personnel; their Project office address and location, e-mail address, office, fax number, cellular and/or pager number(s); and their Project title and area(s) of responsibility.

On an organization chart, Design-Builder shall graphically represent the Project hierarchy and, as a minimum, identify personnel with responsibility for the following functions:

- **Project Management**
- **Quality Control / Quality Assurance**
- **Quality Management**
- **Construction Management**
- **Design Management**
- **Environmental**
- **Environmental Compliance**

- **Subcontracts and Procurement**
- **Design:**
  - Roadway
  - Structures
  - Drainage
  - Geotechnical
  - Advanced Traffic Management System
  - Materials
  - Pavement
  - Traffic
  - Coordination
  - Utilities
  - Agencies
- **Safety**
- **Project control**
- **Community Involvement**
- **Public Information**
- **Survey**
- **Materials Testing**
- **Project Closing**
- **Right-of-Way (ROW)**
  - Design
  - Appraisal
  - Negotiation
  - Relocation

***Changes:***

Design-Builder shall update the directory throughout the course of the Project. Key personnel cannot be replaced without Department approval. Submit the names and qualifications of the proposed replacement(s) to the Department for advance approval.

### **2.1.5.3 Communications**

#### **2.1.5.3.1 Communication Systems**

***General:***

Design-Builder shall establish the communication systems necessary to control all facets of the Project. Design-Builder shall maintain communications with the Department, other entities as required for the management of the Project, WSDOT and local and regional emergency response agencies or entities (including the Washington State Highway Patrol), in accordance with the requirement of the Contract Documents. WSDOT will use radio-capable NEXTEL mobile telephones.

***WSDOT Web Site and WAN:***

Design-Builder shall provide e-mail addresses for WSDOT staff compatible with WSDOT's system and maintain capability to access the State web site. Design-Builder shall provide the capability for WSDOT staff to connect to the WSDOT email system and other WSDOT network resources. For details of system requirements, see Section 2.1.7-Software.

#### **2.1.5.4 Meetings and Coordination**

##### **2.1.5.4.1 Weekly Meetings**

Plan and schedule for weekly meetings with the Department Project representatives to discuss Project progress, issues, and planned Work for all phases of design and construction.

Design-Builder shall develop the meeting agendas and shall provide meeting facilities.

Design-Builder shall record minutes of each coordination meeting and distribute copies to the Department participants within five calendar days of the meeting date for the Department's information and confirmation.

##### **2.1.5.4.2 Specialty Meetings**

Design-Builder shall plan for specialty meetings for safety, quality, public and environmental issues.

##### **2.1.5.4.3 Public Information and Public Relations**

See Section 2.9 – Public Information and Community Involvement for staffing and requirements.

##### **2.1.5.4.4 Community Involvement Groups**

Design-Builder shall organize, participate and provide support for community involvement groups pertaining to Work on the Project.

Design-Builder shall interface with advisory committees, whose meetings will continue throughout the design and construction phases.

See Section 2.9 - Public Information and Community Involvement and Section 2.14 – Roadside Restoration and Aesthetics for additional information.

##### **2.1.5.4.5 Design Task Force Meetings**

The Design-Builder shall meet and coordinate with the Department for all civil disciplines prior to design to reach agreement and clarify design criteria.

#### **2.1.5.5 Emergencies**

##### ***Emergency Actions:***

In any emergency affecting the safety or protection of persons or the Work or property at the Site or adjacent thereto, Design-Builder shall act to prevent any threatened damage, injury, or loss. If the Design-Builder believes that any significant changes in the Work or variations from the Contract Documents have been caused thereby or are required as a result thereof, Design-Builder shall give the Department prompt written notice.

#### **2.1.5.6 Subcontracts**

##### **2.1.5.6.1 General**

Design-Builder shall incorporate into each subcontract the provisions specified in Section 1-08.1 Subcontracting.

##### **2.1.5.6.2 Communication**

Design-Builder shall require all Subcontractors, suppliers, and other such individuals or entities performing or furnishing any of the Work to communicate with the Department only through the Design-Builder.

##### **2.1.5.6.3 Coordination**

Accept sole responsibility for scheduling and coordinating the Work of subcontractors, suppliers, and other such individuals or entities performing or furnishing any of the Work under direct or indirect Contract with the Design-Builder.

#### **2.1.5.7 Facilities and Space Requirements**

Design-Builder shall provide and pay for all office and other building space, facilities, equipment, and vehicles necessary to construct the Project and meet the requirements of the Contract and of this Section.

Design-Builder shall locate the Project office within 5 miles of the Project Site.

##### **2.1.5.7.1 Department Staff Facilities**

Design-Builder shall provide for the Department's staff a minimum of 25 office spaces of 100 square feet each that are co-located with the Design-Builder's design, construction management and Project controls/business staff and computers with at least the software and connections listed in Section 2.1.7. The Design-Builder shall make the office spaces and other building space, facilities, and equipment available to WSDOT staff not more than 45 days after Notice to Proceed (NTP).

Design-Builder shall provide secured free parking spaces for 30 WSDOT staff vehicles.

#### ***General Requirements:***

1. Include desks, chairs, and telephones in all offices. Provide copying and fax equipment services.
2. Secure sites, obtain all Site permits, install and pay for all utility services, and maintain the facilities as part of the Work.
3. Include in the offices at least two exits from each building or trailer and secure each entrance with a door lock plus a deadbolt lock.
4. Provide daily janitorial service (except holidays) and maintain trash containers and trash pickup service.
5. Maintain the exterior areas of office spaces, including access to parking areas and snow removal.
6. In all interior spaces, include overhead lighting that meets the requirements of U.S. Occupational Safety and Health Administration (OSHA) and building and electrical codes for office space that has a minimum circuit capacity of 20 amperes, and provide at least two duplex receptacles for each office space.
7. Provide restrooms until Physical Completion of the Project, unless otherwise agreed by the Department in writing.
8. Meet all access requirements of the Americans with Disabilities Act.
9. Provide heating, ventilation, air conditioning, and cooling systems capable of maintaining temperatures between 65 and 75 degrees Fahrenheit in all spaces throughout the year.
10. Meet all local building code requirements.
11. Provide one touch-tone speaker telephone for each office, each with a status indicator and access to all outside lines and conference call systems.
12. Dispose or remove all Design-Builder-provided facilities and perform any required Site restoration Work prior to Physical Completion.
13. For all Department offices that are provided, maintain them for at least 90 Calendar Days after Physical Completion of the Project, unless otherwise agreed by the Department in writing.

## **2.1.6 Project Documentation**

### **2.1.6.1 General**

Design-Builder shall accept sole responsibility for the documentation of all Project Work activities.

Maintain in good order, in a secure and protected place at the Site, one (1) record copy of all drawings, specifications, addenda, written amendments, change orders, Work change directives, field orders, and written interpretations and clarifications. Annotate them to show changes made during construction. Make these record documents, together with all approved samples and approved shop drawings, available to the Department for reference.

The Design-Builder shall use an electronic Document Control System to manage all Project documents. The Design-Builder's Document Control System must be able to be integrated into the Department's system; implementation details will be arranged after Contract award.

#### **2.1.6.1.1 Format**

Design-Builder shall maintain all files in both the electronic media indicated in Section 2.1.7 - and as hard copies.

#### **2.1.6.1.2 Communications Distribution**

As a minimum, Design-Builder shall prepare and circulate to the Department and attendees of all meetings, hard copies and electronic files of all correspondence, minutes of meetings, etc., developed as a result of any and all communications with:

1. The Department
2. Utility owners
3. Communities
4. Agencies
5. Members of the public

Accept sole responsibility for ensuring that all communications are distributed to the appropriate parties.

#### **2.1.6.1.3 Electronic Files**

##### ***Backups:***

Design-Builder shall back up all electronic files partially every day and fully every week, and shall store all back-up tapes and compact disc (CD) ROMs in a secure area. See Section 2.1.7 - Software for software requirements.

##### ***Data Back-up and Recovery***

Design-Builder shall develop and implement data security back-up and recovery plan for Project information under the control of the Design-Builder.

#### **2.1.6.2 Design Documentation**

##### **2.1.6.2.1 Communication and Submittal Documentation**

Design-Builder shall maintain throughout the course of the Project, in the Design-Builder's engineer's office two (2) complete sets (at a minimum) of:

1. Project Contracts
2. Calculations
3. Reports
4. Studies and investigations
5. Plans
6. Communications
7. Minutes of meetings
8. Review comments
9. Permits
10. ROW Agreements
11. Utility Agreements

At the completion of the Project, Design-Builder shall submit one set in hardcopy and one in electronic form of the documents listed above to the Department for its retention and use.

### **2.1.6.3 Field Documentation**

#### **2.1.6.3.1 Communication and Submittal Documentation**

Design-Builder shall maintain in the on-site Project office, and make available for Department review, two (2) complete hard copy sets of orderly files (at a minimum) that include the following:

1. Contracts
2. Subcontracts
3. Change orders
4. Shop drawings
5. Pay invoices
6. Minutes of meetings
7. Field directive changes
8. Claims
9. Calculations
10. Reports
11. Tests
12. Drawings. Do not mark on one set of the drawings, and use the other set as the master copy for As-Built control records.

At Physical Completion of the Project, submit one (1) set of the documents listed above to the Department for its retention and use.

#### **2.1.6.3.2 Record Drawing Documentation**

##### **2.1.6.3.2.1 Work In Progress:**

Design-Builder shall maintain in the field office a complete, neatly marked-up set of drawings upon which daily changes, alterations, and deletions are made to the “Release for Construction” documents. All mark-up revisions shall be made with a red pencil and dated for correlation with field directive changes and change orders.

As-Built changes shall not be made without approval by the Engineer of Record.

##### **2.1.6.3.2.2 Project As-Built**

Prior to Physical Completion, Design-Builder shall provide the WSDOT with the following:

1. As-Built Plans, files and a signed hard copy)
2. Relevant data not previously submitted.

*Take special care to ensure that all construction changes have been entered on all As-Built documents affected by the change.*

Design-Builder shall include in the As-Built Plans all changes and corrections to the plans that depict the final completed component, with relevant data showing (including copies of calculations not previously submitted with shop drawings or Final Design Documents)

#### **2.1.6.3.2.3 Format**

Design-Builder shall submit the As-Built Plans in the Department's standard format, organized in accordance with standard Department numbering and naming conventions. Design-Builder shall make all electronic files consistent with the software requirements of Section 2.1.7 and shall submit two (2) complete electronic sets on CD ROM (using the CADD standards on the Department web site) and as specified in Section 2.1.7, as follows:

1. Enclose an accompanying index and instructions
2. Attach a cover sheet to the As-Built Plans of each constructed Work component. On the cover sheet, include a written certification by the Construction QA Manager that the As-Built Plans accurately and completely indicate all changes and corrections made during construction.
3. Obtain the signature, certification, and stamp of the Design QA Manager, and the Engineer of Record on the cover sheet of the As-Built Plans for each constructed Work component.
4. Stamp or otherwise clearly mark each sheet of the As-Built documents "AS-BUILT."
5. Submit a final copy of Right of Way drawings signed and stamped by a Washington State Licensed and Registered Land Surveyor.

#### **2.1.6.4 Document Control Verification**

##### ***General***

Monthly, or more often as the situation may warrant, the Department will review the Design-Builder's document control performance. Develop a sign-off sheet that is filled out monthly, signed by the Project Manager, Design QA Manager and Construction QA Manager, and submit it with each monthly invoice as indicated in General Provisions Section 1.09.9(1).4 Progress Report. The Department, as indicated in General Provisions Section 1.09.9(2) (Payment), may withhold payment until documentation issues are corrected as specified herein.

#### **2.1.7 Software**

##### **2.1.7.1 General**

Design-Builder shall acquire, use, and maintain for Project the software as specified in this Section or as specified elsewhere in the Contract.

##### ***Version:***

Design-Builder shall use the current version of the specified software in effect as of Notice to Proceed, unless otherwise called for in this Section.

***Updates:***

Design-Builder shall update software programs throughout the Contract within six (6) months of release of a software update, or earlier if mutually agreed to with the Department. The Department will similarly update its software.

***File Server:***

Design-Builder shall store all data files for the applications included in this Section on, or have them accessible through, the Design-Builder's central file server.

**2.1.7.1.1 Required Project Software**

Design-Builder shall submit all design documentation, whether it is in process, final, or As-Built, to the Department as both hard-copy printouts and electronic files on CD ROMs.

Design-Builder shall use the following software programs for Project Work in addition to all other software specified in the Contract Documents:

***Roadway.***

InRoads (by Bentley)—Same version the Department is using at Notice to Proceed

MicroStation (by Bentley)—Same version the Department is using at Notice to Proceed

***Structures.***

MicroStation (by Bentley)—Same version the Department is using at Notice to Proceed

***Traffic Signals.***

See Section 2.17

***Intelligent Transportation System and Maintenance of Traffic.***

See Section 2.18 & Section 2.20

***Viewing of CAD Files.***

Bentley MicroStation

***Word Processing and Spreadsheets.***

Microsoft Word (for word processing)

Microsoft Excel (for spreadsheets)

Microsoft Access (for database)

Contract Software Programs

***Text Documents.*** Text documents generated in the RFP were produced in Microsoft Word. The filenames are designated by a “.doc” extension.

***Spreadsheets.*** All spreadsheet files in the RFP were created in Microsoft Excel. The filenames are designated by an “.xls” extension.

***CADD Drawings.*** All CADD files in the RFP were created in MicroStation. The filenames are designated by a “.dgn” extension.

**Scanned Documents.** The filenames of scanned documents are designated by a “.pdf” extension.

#### **2.1.7.1.2 Department Electronic Communications**

The Department uses the following software for its electronic communications, but use by the Design-Builder is optional.

***Network Communications.***

Design –Builder shall provide a T-1 or better connection for network connections to WSDOT system. Contact David Schmidt at 206.440.4926, email: schmidtd@wasot.wa.gov, to coordinate network connections.

***E-mail and Scheduling Software.***

The Department uses Microsoft Outlook and Exchange Server for email services. Contact David Schmidt at 206.440.4926, email: schmidtd@wsdot.wa.gov, to coordinate network connections and establish email services required.

***Document Control.***

The Design-Builder and the Department shall share Project data. The Department’s document control and data system software for the Project is under development. The Design-Builder’s document control system must be able to be integrated into the Department’s system; implementation details will be arranged after Contract award.

## **2.2 SECTION NOT USED**

## **2.3 SECTION NOT USED**

## **2.4 DESIGN VARIANCE**

### **2.4.1 Project Design Variance**

A list of the design variance and their locations are listed in RFP Appendix M2-Design Variance Inventory. Justification for the Pre-Approved Design Deviations is in RFP Appendix M3, and the Evaluate Upgrade is in RFP Appendix M4. Changes to the Project design variance proposed by the Design-Builder require WSDOT approvals.

### **2.4.2 Additional Design Deviation/ Evaluate Upgrade**

The Design-Builder shall avoid additional design deviation/Evaluate upgrade except on conditions where the Design-Builder demonstrates that substantial benefits to the Project and the public would accrue from the Design-Builder’s recommendation, as Approved by WSDOT. The functional outcome of the proposed deviation\evaluate upgrade must be equivalent to or better than the Pre-Approved Deviations\evaluate upgrade.

Additional design deviations\evaluate upgrade must be submitted and approved by WSDOT.

#### **2.4.2.1 Deviation\Evaluate Upgrade Process**

The Design-Builder shall submit design deviation/evaluate upgrade requests in a letter addressed to the Department. See RFP Appendix F for forms or additional information.

The deviations/evaluate upgrades requests shall consist of the following items:

1. Cover sheet identifying the deviation(s)/Evaluate upgrade(s) by number, Project title, and Project number.
2. Completed Deviation\Evaluate Upgrade Request for each element that does not meet standards. The Request shall address the following items:
  - A. General Project Description
  - B. Existing Condition
  - C. Deviation\Evaluate Upgrade Requested
  - D. Geometric Elements
  - E. Design Alternatives
    - a. Build to Meet Standards
    - b. Proposed Design
    - c. No-Build
  - F. Recommendations
3. Supporting documentation indicating the justification for the deviation\evaluate upgrades. The documentation and Justification shall address the following items:
  - A. Vicinity Map
  - B. Design Matrix
  - C. Site conditions of the deviation
  - D. Alternative Plans
  - E. Cost Estimates
  - F. Accident History

WSDOT will review the submittal within 10 business days and respond with a decision.

WSDOT shall be reimbursed by Change Order for all cost savings resulting from any design deviation proposed and approved after award of the Contract by the Design-Builder.

#### **2.4.2.2 Submittals**

Design-Builder shall submit 5 copies of the deviation\evaluate upgrade to WSDOT as both hard-copy printouts and electronic files on CD ROM's. Use software provided in Section 2.1.7

## **2.5 SURVEYS AND MAPPING**

### **2.5.1 General**

The Design-Builder shall be responsible for all of the survey and mapping work necessary to construct the Project.

The Work includes all work necessary to meet the requirements associated with land surveying and survey mapping, including secondary horizontal and vertical control surveys, topographic surveys, Right of Way surveys, bridge surveys, Utility surveys, Design surveys, construction surveys, as-built surveys, Records of Surveys, Permits to Destroy and Remove Monuments, Land Corner Records and all other land surveying services necessary to complete the Project.

Establish and stake the WSDOT Right of Way lines at the Project Work Site if Work is within 25 feet of the WSDOT Right of Way limits.

### **2.5.2 Mandatory Standards and Reference Documents**

#### **2.5.2.1 Mandatory Standards**

**General.** Perform survey work in accordance with the requirements of the Mandatory Standards listed in Table 2.5.1. The documents in Table 2.5.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed standard as of the initial publication date of this RFP unless modified by Addendum or Change Order.

Design-Builder shall perform all field survey Work, design and construction in Project ground datum. Any conversion from Metric to English shall use the U.S. Survey foot definition: 1 meter = 39.37 inches exactly.

The WSDOT provided dtm for mainline I-5 and the existing ramps was obtained from the photogrammetric digital. The areas between fog lines at the medium and from fog line to the right of way limit has been surveyed by WSDOT survey crews and is accurate within .02' minimum for bridge, 0.02' minimum manmade objects and 0.1' for ground breaks.

The Design-Builder will identify areas requiring additional topographic survey checks or verification and will be responsible for performing any additional survey Work it deems necessary or desirable.

#### **Table 2.5.1**

#### **Mandatory Standards for Survey**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1	WSDOT	Highway Survey Manual	M 22-97		
2		American Congress on Surveying and Mapping			
3	American Society of Civil Engineers	Definitions of Surveying and Associated Terms			

## 2.5.3 Performance Standards

### 2.5.3.1 General

Geodetic primary survey control information and history is available on the WSDOT Monument Database, web address of: <http://www.wsdot.wa.gov/monument>. Copies of WSDOT provided primary survey control data are in RFP Appendix X. Enhancement of the geodetic primary control shall meet National Geodetic Survey “Order C” horizontal standards Second Order Class II vertical standards and coordinated with the WSDOT Geographic Services Survey Office.

The Design-Builder shall verify and confirm the location, accuracy and datum of all information provided to the Design-Builder, regardless of the source of information. The Design-Builder shall document all forms of data verification. If the Design-Builder identifies any discrepancy, the Design-Builder shall perform the necessary Work to resolve the discrepancy.

Detailed survey records shall be maintained of the control points used and the equipment and methods used to establish the control points. This information will be made available to WSDOT when requested.

The Design-Builder shall obtain any permits that may be required prior to beginning field Work. Preparation of surveys shall conform to requirements referenced in Section 2.5.2.1 including (but not necessarily limited to) procedures, record-keeping requirements, equipment use, and safety precautions.

A traffic control plan shall be prepared whenever Work or when the Work crew’s vehicle will be within any roadway clear zone. All survey crews working within Limited Access Highway Margins shall have a General Permit in each vehicle.

### 2.5.3.2 Survey Manager

The Design-Builder shall designate a Survey Manager for the Project. The Survey Manager will manage all Design-Builder survey activities associated with the Project and shall be responsible for directing and reviewing all Design-Builder and Subcontractor survey Work

and be the point of contact for all survey activities. If the Survey Manager is not currently licensed as a Professional Land Surveyor (PLS) in the State of Washington, Design Builder shall provide a Washington licensed PLS for all property boundary and Right of Way line surveying.

### **2.5.3.3 WSDOT Provided Surveys and Mapping**

To facilitate the establishment of horizontal controls and elevations, WSDOT will provide the Design-Builder with primary survey control information consisting of descriptions of primary control points used for the horizontal and vertical control, and descriptions of additional Project control points for every additional 3 miles of Project length. Project control points will be described by reference to the primary alignment and the coordinate system and elevation datum utilized by the Project.

The WSDOT-supplied survey is in compliance with National Spatial Data Infrastructure “Standards for Geodetic Networks, 1996”, specifications derived from Federal Geodetic Control Subcommittee (FGCS) “Geometric Geodetic Standards and Specifications for Using GPS Relative Positioning Techniques, 1989” and FGCS Specifications and Procedures to Incorporate Electronic Digital/Bar-code Leveling Systems, 1995.

Horizontal accuracy for geodetic primary control is  $<2$  cm, defined as the diameter of a circle of uncertainty, such that the true or theoretical location of the point falls within that circle 95% of the time.

Vertical accuracy for geodetic primary control is  $<1$  cm, defined as a linear uncertainty value, such that the true or theoretical location of the point falls within the linear range of uncertainty value 95% of the time.

WSDOT has prepared mapping for I-5 from MP 189.30 to MP 194.32.

Primary and secondary survey horizontal control was established by WSDOT with GPS equipment in the Washington coordinate system, north zone, North American Datum of 1983 (NAD 83/91) with a data set accuracy of  $<0.02$  M @ 2 Sigma. At the request of the Design-Builder, WSDOT GIS (Geographic Information System) will provide the Medidata (data set) used to transform the data associated with the photogrammetric digital map included with this document.

The initial geodetic primary and secondary Project control coordinates were converted from State Plane coordinates to Project Ground coordinates. The State Plane control coordinates were divided by the combined factor of 0.99993997. The combined factor was derived by multiplying the elevation factor of 0.99999323 by the scale factor of 0.99994674. To ensure that the Project Ground coordinates are not mistaken for State Plane coordinates, 100,000 meters were added to both the northings and eastings. This was then converted from metric to English using the U.S. Survey foot definition: 1 meter = 39.37 inches exactly. This Project shall be developed using English units.

Vertical control is based on North American Vertical Datum of 1988 (NAVD 88).

The 3D MicroStation .DGN file comprised of photogrammetric data was transformed from State Plane coordinates to Project Ground datum.

Secondary surveys are designed to provide supplemental Project datum references for topographic mapping and as-builts of existing terrain features and structures. Typical secondary traverse accuracy performed by WSDOT NWR for this Project is greater than 1:100,000. Electronic bar code leveling was performed on all secondary control points and meet or exceed third order standard of accuracy (12 square root kilometers leveled).

Tertiary surveys provide for topographical mapping and structural as-builts. Tertiary surveys performed by WSDOT NWR for this Project meet a local positional accuracy standard of less than 3cm.

Further information on WSDOT NWR secondary and tertiary surveys can be obtained by contacting Kurt Iverson at 360.709.5532

Note:

- As-Builts of structures have not been completed.
- Edge of pavement survey measurements were directly observed by using reflectorless techniques (accuracy less than 1 cm).
- Fog line measurements were observed with a reflector on a pole tilted sideways for safety reasons (accuracy less than 2cm).
- Perteet Engineering did much of the topographic survey on the east side of the North Bound lane.
- WSDOT NWR performed all drainage surveys and ramp topographic survey.

Monuments disturbed by any construction activity require a “Permit to Remove and Destroy” from Washington State Department of Natural Resources (WAC332-120). In addition, WSDOT Geographic Services must be notified of any geodetic primary control to be disturbed.

Areas obscured due to dense trees, brush or dark shadows will contain unreliable x, y, z data. The Design-Builder is responsible in identifying these areas and performing necessary field surveys.

WSDOT did not obtain any field data regarding the vertical or horizontal location of the crown point of existing NB or SB I-5. The cross-sections provided in the RFP, Appendix M 10, in the areas of the existing pavement surface, may be assumed accurate only in locations where WSDOT obtained field survey data, which was usually at the left edge of the far left driving lane and the right edge of the far right driving lane. (Refer to appendix M11 Basemap Survey Data) The cross-sections show a straight-line interpolation between these two points, which fails to show a crown point when one exists. Design-Builders are expected

to devise their own method of developing existing pavement cross-sections that meet their accuracy and level of detail needs for designing and pricing their proposal.

## **2.5.4 Design and Construction Criteria**

### **2.5.4.1 Design Survey Work**

All field survey Work shall be suitable for Design and Construction Document preparation and meet the technical requirements of WSDOT, FHWA, and WAC 332-130 (Survey Standards). Enhancement of the geodetic primary control shall meet National Geodetic Survey “Order C” horizontal standards, Second Order Class II vertical standards and be coordinated with the Geographic Services Survey Office.

The Design-Builder shall utilize Section 1450 of the Design Manual For Design Build Projects for modifying existing monumentation.

The Design-Builder shall report all field survey Work in Project ground datum, except geodetic primary control, which must be on the state plane coordinate system.

Whenever construction is required to connect or tie-in to existing facilities, the Design-Builder is responsible to field-verify existing vertical and horizontal locations and to provide a design and construct a connection that provides a finished product that meets all Contract requirements. Differences between as-built information provided in the RFP and actual field conditions are to be expected. Any differences are at the sole risk of the Design-Builder and shall not be considered a changed condition.

### **2.5.4.2 Construction Surveying – Bridge**

Except for the survey control data to be furnished by WSDOT, calculations, surveying, and measuring required for setting and maintaining the necessary lines and grades to perform the Work is the Design-Builder's responsibility.

WSDOT may spot-check the Design-Builder's surveying. These spot-checks will not change the requirements for normal checking by the Design-Builder. Design-Builder will provide WSDOT with a copy of the calculations and survey records required to do a spot check.

### **2.5.4.3 Construction Surveying - Roadway**

WSDOT may spot-check the Design-Builder's surveying. Geographic Services Survey Section will review and check geodetic primary control enhancements. These spot-checks will not change the requirements for normal checking by the Design-Builder. Design-Builder will provide WSDOT with a copy of the calculations and survey records required to do a spot check.

When staking roadway alignment and stationing, the Design-Builder shall perform independent checks from different secondary control to ensure that the points staked are within the specified survey accuracy tolerances.

#### **2.5.4.4 Monumentation**

**General** - Design-Builder shall document any WSDOT, Governmental monumentation and property corners that will be disturbed or destroyed during the Contract. The Design-Builder will follow the procedures as set forth under Chapter 9 of the WSDOT Highway Surveying manual relating to the destruction and replacement of monumentation. Copies of any and all permits that are required for the removing and resetting of monuments will be submitted to the Department within 3 days of submittal to the DNR. Copies of the destroyed and reset monument records shall be sent to WSDOT NW Region R/W Plans – Land Survey Section.

### **2.5.5 Submittals**

#### **2.5.5.1 Survey Records**

Survey records shall be delivered in a hardcopy format and electronic file format compatible with Bentley MicroStation and Inroads. They shall be delivered within 90 days of Physical Completion.

#### **2.5.5.2 As-Builts**

The Design-Builder shall produce reports documenting the location of the as-built alignments, profiles, structure locations, Utilities, and survey control monument placement. These reports shall include descriptive statements for the survey methods used to determine the as-built location of the feature being surveyed. The Design-Builder as-built data shall include the coordinate types (x, y, and/or z) and feature codes in the same format that the preliminary construction data was generated in. Where data has been provided to the Design-Builder from WSDOT in x, y, z coordinate format the Design-Builder shall provide the WSDOT with data in an x, y, z coordinate format. Where data has been provided to the Design-Builder from WSDOT in an x, y only coordinate format, or z only coordinate format, the Design-Builder shall provide WSDOT with data in x, y only coordinate format, or z only format.

## **2.6 GEOTECHNICAL**

### **2.6.1 General**

The Design-Builder shall review the existing geotechnical information, which includes the Geotechnical Baseline Report prepared for this Project and included in these Contract Documents, evaluate the requirements of the Work, and perform geotechnical explorations, geotechnical analyses, and laboratory testing, sufficient to supplement the existing data, and to provide geotechnical designs and construction support in accordance with this RFP Section.

## 2.6.2 Mandatory Standards and Reference Documents

### 2.6.2.1 Mandatory Standards

**General.** Design and construct the roadway in accordance with the requirements of the Mandatory Standards listed by priority in Table 2.6.1. The documents in Table 2.6.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of this RFP unless modified by Addendum or Change Order.

**Table 2.6.1**  
**Mandatory Standards for Geotechnical**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for the I-5 Everett HOV Design-Build Project</i>		- -	Proposal
2	WSDOT	<i>WSDOT Geotechnical Design Manual (GDM)</i>			RFP Appendix G3
3	WSDOT	<i>Bridge Design Manual (BDM)</i>	M23-50	Aug. 2002	RFP Appendix J
4	WSDOT	<i>Design Manual For Design Build Projects</i>	M22-02		RFP Appendix Z
5	WSDOT	<i>Highway Runoff Manual</i>	M31-16		
6	WSDOT	<i>Materials Manual</i>	M46-01		
7	AASHTO	<i>LRFD Bridge Design Specifications, US Units</i>		2004	
8	AASHTO	<i>Standard Specifications for Transportation Materials &amp; Methods for Sampling &amp; Testing, 24<sup>th</sup> Edition</i>		2004	
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					

### **2.6.2.2 Reference Documents**

Design-Builder may use Reference Documents as cited in the GDM (RFP Appendix G3) and BDM (RFP Appendix J) used for this Project.

### **2.6.2.3 Historical Geotechnical Data**

Historical records for previous geotechnical studies and related contract Work along the I-5 Project alignment are provided in RFP Appendix G2. This information includes test boring logs, substructure details (foundation type and bearing elevation), and subsurface profiles for many, but not all, of the existing bridges. The Design-Builder should use this information at its discretion. WSDOT makes no warranty, either expressed or implied, on the accuracy of this information.

## **2.6.3 Performance Requirements**

### **2.6.3.1 Personnel Requirements**

The Design-Builder shall provide a Geotechnical Group Manager with a minimum of 10 years of supervisory experience in geotechnical design and construction support of roadways, bridges, retaining walls and other highway related elements. This individual shall have at least five years of experience working in Washington State and shall be familiar with the AASHTO Load and Resistance Factor Design (LRFD) design specifications. This individual shall be a Professional Engineer licensed by the State of Washington and shall be in responsible charge of the geotechnical design elements of the Project.

The individuals responsible for the installation and monitoring of instrumentation such as inclinometers, piezometers, settlement indicating devices, SPT testing, Becker Hammer testing, etc., shall have a minimum of 2 years experience with the specific type of instrumentation the individual will be using.

### **2.6.3.2 Subsurface Investigations**

The Design-Builder shall conduct a subsurface investigation program to supplement information provided in the Baseline Geotechnical Report (RFP Appendix G1) to complete the final geotechnical design for the Project. Additional explorations as determined necessary by the Design-Builder and to meet mandatory standards shall occur at bridge foundation locations, along the alignment of planned retaining walls, at significant cuts and fills, building structures, noise walls, culverts, signs, signals, and storm-water retention-detention ponds. All historical geotechnical data can be found in (RFP Appendix G2).

The investigation shall be conducted in accordance with the GDM (RFP Appendix G3). The Design-Builder shall determine the specific locations, frequency, and scope of the supplemental subsurface investigation. Geotechnical investigations at locations of storm-water retention-detention ponds and structures shall be performed as specified in the WSDOT *Highway Run-off Manual*.

The subsurface investigation program shall be submitted to the WSDOT for review and comment prior to start-up of any earthwork or excavation. This submittal shall include the

number and depths of the proposed borings/cone penetration tests (CPTs) and other field investigations, and the proposed sampling and testing, to meet the minimum requirements of the Project. Instrumentation to be used for design and construction monitoring purposes shall also be included in the exploration plan (e.g. piezometers, slope inclinometers, etc). The submittal shall also include a traffic control plan, where investigations are in or adjacent to active freeway or city streets. The Design-Builder shall secure an access permit from the appropriate agency, if required.

Soil properties used for design shall be determined in accordance with the GDM (RFP Appendix G3). Field tests shall be conducted in general accordance with appropriate AASHTO and WSDOT standards.

Following completion of exploratory Work, all boring locations shall be surveyed, and station and offset, elevation, and state plane coordinates, shall be determined and included on the boring logs. Following drilling and laboratory Work, the Design-Builder shall retain all samples until the Completion of the Project, and shall provide such samples to WSDOT, if requested, before the end of this time period.

#### **2.6.3.3 Laboratory Testing Requirements**

Laboratory testing of collected soil and groundwater samples shall be conducted in accordance with the GDM (RFP Appendix G3), and applicable WSDOT and AASHTO testing procedures. Laboratories conducting geotechnical testing shall be either AASHTO accredited for the testing being performed or fulfill the requirements of AASHTO R18 for qualifying testers and calibrating/verifying of testing equipment for those tests being performed. All test results shall be included in the Draft and Final Geotechnical Reports.

#### **2.6.3.4 Instrumentation**

The Design-Builder shall develop, implement, and maintain a documented Geotechnical Instrumentation Plan to satisfy design and quality control requirements. The Instrumentation Plan shall be available to the WSDOT for review throughout the Project.

Prior to starting any earthwork, the Design-Builder shall identify and submit in writing to the Department the recommended instrument types, locations, purpose, installation requirements, zones of influence, critical readings, and planned frequency of readings.

The Design-Builder shall install geotechnical instrumentation where necessary to monitor parameters such as the following:

- Settlement and settlement rates of embankments and structures,
- Pore water pressures,
- Groundwater levels, and
- Stability of walls and slopes.

Any instruments that are damaged during construction and require removal and/or recalibration shall be replaced and/or recalibrated by the Design-Builder.

The Draft and Final Geotechnical Reports shall include the Geotechnical Instrumentation Plan and all critical readings, during both design and construction.

#### **2.6.3.5 Borehole Site Cleanup**

Backfilling of borings, test pits, CPT holes, etc., shall be performed in accordance with the provisions of applicable local, State, or Federal laws and regulations. Borings shall be abandoned in accordance with Washington State Dept. of Ecology regulations.

The Design-Builder shall backfill all test holes in a manner that ensures against subsequent settlement of the backfill and holes hazardous to persons, animals, or equipment. Upon completion of the field investigation Work, the Design-Builder shall remove all surplus material, temporary structures, and debris on land and water resulting from the Work.

#### **2.6.3.6 Field Logs**

The field logs shall be prepared in accordance with the requirements of the *GDM* (RFP Appendix G3). Logs of all field explorations shall be included in the Design-Builder's Final Geotechnical Report for the Project.

#### **2.6.3.7 Geotechnical Analyses**

The Design-Builder shall perform geotechnical engineering and geologic analyses based on the findings from subsurface investigation and laboratory testing programs, and results of engineering analyses, including information provided in the Baseline Geotechnical Report, in accordance with the *GDM* (RFP Appendix G3) and standards and publications referenced herein.

### **2.6.4 Design and Construction Criteria**

#### **2.6.4.1 Bridge Foundation Design**

All new bridge foundations shall be designed using the LRFD specifications, as described in the *GDM* (RFP Appendix G3), *BDM* (RFP Appendix J), and AASHTO *LRFD Bridge Design Specifications*.

#### **2.6.4.2 Wall Design**

All retaining walls and wall foundations shall be designed using the LRFD specifications, as described in the *GDM* (RFP Appendix G3), *BDM* (RFP Appendix J), and AASHTO *LRFD Bridge Design Specifications*, except for soil nail walls, MSE Walls and noise walls. Soil nail walls shall be designed using the Service Load Design (SLD) method as required in the *GDM* (RFP Appendix G3). Noise walls shall be designed using the Load Factor Design (LFD) method as required in the *GDM* (RFP Appendix G3). MSE walls shall be designed

using either the SLD method or the LRFD method as required in the *GDM* (RFP Appendix G3).

#### **2.6.4.3 Deflection Criteria**

Criteria for allowable settlement and horizontal deformation of retaining structures, hydraulic structures, and bridge foundations/piers provided in the *GDM* (RFP Appendix G3) and *BDM* (RFP Appendix J) shall be used for the design of these structures.

#### **2.6.4.4 Damage to Adjacent Structures and Utilities**

The Design-Builder is responsible for all damage caused by their activities to structures on or immediately adjacent to State right-of-way. “Structures” are defined herein as all private residences, privately owned buildings, and all existing and proposed public facilities including, but not limited to, utilities, drainage facilities, bridges and buildings.

Damage to structures may be caused by excessive vibrations, embankment-induced settlement, physical impact, and others. Before construction operations commence which may cause damage to sensitive facilities, the Design-Builder shall identify instrument types, locations, zones of influence, critical readings, and frequency of readings in a Settlement and Vibration Monitoring Plan. For non-WSDOT owned buildings and other structures, including private residences and City Streets within a minimum of 200 feet of the Project boundaries, the Design-Builder shall conduct a pre-condition survey. Additional pre-condition survey may be necessary as recommended by the Design-Builder’s Geotechnical Engineer. This survey should include video or photographic documentation of internal and external building walls and foundations. The pre-condition survey and Settlement and Vibration Monitoring Plan shall be provided to the WSDOT Project Office prior to beginning any construction activity.

Where embankments are planned, the Design-Builder shall install instrumentation to monitor settlements of structures, utilities, and other features within the zone of influence of the embankment, where existing and proposed facilities are founded on settlement-sensitive, or soft, ground. For embankments, the zone of influence shall be defined as a zone extending a minimum horizontal distance ( $H$ ) from the toe of the embankment, where  $H$  is the height of the embankment. For retaining walls, the zone of influence shall extend from the toe of the footing to a minimum distance of twice the height of the wall.

Where impact or vibratory pile driving is planned, vibration monitoring shall be conducted where sensitive structures or utilities are within 100 feet of pile driving operations. The Design-Builder shall be required to cease all operations when vibration-recording equipment exceeds a peak particle velocity of 2 in/sec.

#### **2.6.4.5 Unstable Slope Areas**

Several areas along the Project alignment have been historically identified as unstable and have exhibited landsliding characteristics. Two specific areas lie along the east side of the

northbound shoulder, where fills were used to construct the original highway. These areas are identified as the Woods Creek Slide (Milepost 189.6 to 189.9) and the Lowell Road Hillside (Milepost 190.6 to 190.9). At these locations, historical and recent evidence indicates localized slope failures have occurred. As part of the geotechnical investigation, the Design-Build team shall fully examine these areas and develop appropriate construction procedures to prevent impact to the stability of these unstable areas.

The current Project does not include plans to widen I-5 eastward or raise the current northbound roadway profile at these locations. Therefore, the Design-Build team shall not conduct construction activities along the eastern shoulder that could negatively impact the stability of the existing slopes. This includes minimizing construction traffic on the paved shoulder and keeping all construction traffic off the slopes below the shoulder. In addition, the Design-Builder shall not stockpile materials or equipment on or directly above these slopes. The Design-Builder is responsible for slope stability throughout the Project corridor, both on- and adjacent to State Right-of-Way. Should any landslide scarps develop during construction, the Design-Builder shall cease all activities in this area until the situation is fully assessed by the WSDOT and Design-Builder and measures are taken to stabilize the existing embankment/hillside. Where necessary during construction, the Design-Builder may be required to drain areas of observed or suspected groundwater seepage to avoid the risk of landslide and surface sloughing through the use of gravel drainage blankets, French drains, horizontal drains, and/or placement of a surface rock facing.

## **2.6.5 Submittals**

### **2.6.5.1 General**

Design-Builder shall address all WSDOT comments to the satisfaction of WSDOT. Final versions of technical memorandums and the Geotechnical Report shall be signed and sealed by either a geotechnical engineer or an engineering geologist in accordance with applicable laws. Said engineer or geologist shall be licensed to practice in Washington State.

### **2.6.5.2 Design**

- Subsurface Investigation Program (three copies)
- Technical Memoranda (three copies of each memo)
- Instrumentation Plan (three copies)
- Settlement and Vibration Monitoring Plan, if applicable (three copies)
- Precondition Survey (three copies)
- Geotechnical Report (three copies of draft, ten copies of final)

The Design-Builder shall prepare a Final Geotechnical Report that summarizes the results of the field and laboratory investigation programs, engineering studies and geotechnical design recommendations, including those provided in the technical memorandums, in accordance with the *GDM* (RFP Appendix G3).

### **2.6.5.3 Construction**

The Design-Builder shall not be relieved of obligations to perform the Work in accordance with the Contract Documents by reviews, tests, inspections or approvals performed by any persons, or by any failure of any person to take such action.

The reviews, inspections, tests and comments conducted by WSDOT and others do not constitute acceptance of the materials or Work reviewed, tested or inspected, and WSDOT may reject any Work or materials, request changes and/or identify additional Work which must be done at any time, whether or not previous reviews, inspections, tests or approvals were conducted by WSDOT.

### **2.6.5.4 Unexpected Objects**

Design-Builder shall bear all risks associated with any boulders or unexpected objects encountered during construction in accordance with the Design Documents, including without limitation any delays experienced or costs incurred in the removal or avoidance of such objects. Such risks shall be the sole responsibility of the Design-Builder and shall not constitute as changed condition for the Project.

### **2.6.5.5 Cut and Fill Slopes**

Both cuts and fill slopes are planned as part of this Project. All cut slopes and fill slopes (reinforced and unreinforced) shall be designed per the requirements of the *GDM* (RFP Appendix G3). Sliver fills used for roadway widening shall be terraced into the existing ground a minimum horizontal distance of 5 feet and shall be no greater than 5 feet high.

Where groundwater seeps occur between contacts exposed as a result of any cut, the Design-Builder shall employ measures to reduce degradation of the down-slope soils, capture the water, and convey the collected water down slope to an appropriate treatment facility. Groundwater seeps shall not be permitted to spill uncontrolled onto new or existing slope areas.

## **2.7 PAVEMENT**

### **2.7.1 General**

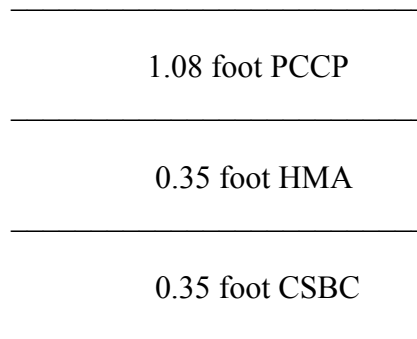
The Design-Builder may use WSDOT's "Preapproved Pavement Sections" described elsewhere in Section 2.7.1 and/or design the pavement sections they will construct. In either case, all requirements of Technical Specification Section 2.7 and the warranty requirements of Section 2.30 shall apply. If the Design-Builder is not willing to warranty the WSDOT's

Preapproved pavement sections, the Design-Builder shall provide their own designed pavement section. The Design-Builders designed pavement sections shall be in accordance with the requirements of this section, including referenced standards and publications, performance requirements, design and construction criteria and submittals.

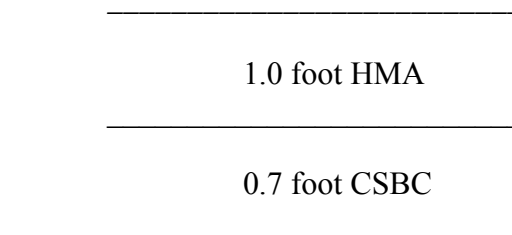
### **WSDOT's Preapproved Pavement Sections**

WSDOT has determined that the following pavement sections will be acceptable for use where constructing new I-5 mainline pavement sections for this Project. The Design-Builder may submit pavement sections of their own design along with supporting calculations and justification if they consider WSDOT's pavement sections to be inappropriate for use, or if the Design-Builder is not willing to warranty the WSDOT Pre-Approved Pavement Section per the warrantee requirements in section 2.30.

The pavement section for PCCP is 1.08 foot of PCCP over 0.35 foot HMA over 0.35 foot CSBC as shown below. The mix design for the HMA, when used as a pavement base under PCCP, shall be based on 100 gyrations - refer to section 9-03.8(2) of the WSDOT Standard Specifications.



The pavement section for HMA is 1.0 foot HMA over 0.7 foot CSBC as shown below.



The Design-Builder's designed pavement section for PCCP shall include the additional 1-inch thickness recommended in the Pavement Design Guide to combat studded tire wear.

## 2.7.2 Mandatory Standards and Reference Documents

### 2.7.2.1 Mandatory Standards

**General.** Design and construct all roadways in accordance with the requirements of this Section, including Mandatory Standards and Reference Documents, performance requirements, design and construction criteria, and submittals.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in Mandatory Standards, Design-Builder shall obtain clarification from the WSDOT before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of this RFP unless modified by Addendum or Change Order.

**Table 2.7.1**  
**Mandatory Standards for Pavements**

Prior ity	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design- Builder	<i>Proposal for I-5 Everett HOV Design- Build Project</i>	n/a		Proposal
2	AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS- 3	2001	"Green Book"
3	WSDOT	<i>Pavement Guide – Volume 1, 2004</i>	n/a	2004	n/a
4	AASHTO	<i>Guide for Design of Pavement Structures</i>	S99-GDPS- 4	1993	n/a
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					

### 2.7.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.7.2 as supplementary guidelines for the design and construction of the roadway. These Reference Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.7.2**  
**Reference Documents for Pavements**

Author or Agency	Title	Document or Report No.	Date	Comments, Short
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				Forms
FHWA	<i>Guidelines for the Design of the Subsurface Drainage Systems for Highway Structural Sections</i>	FHWA RD-72-30	June 1972	n/a
WSDOT	<i>Pavement Surface Condition Rating Manual</i>	n/a	1992	n/a
WSDOT	<i>Construction Manual</i>	M47-01		n/a
AASHTO	<i>Standard Specification for Highways and Bridges</i>	n/a		n/a
WSDOT	<i>Materials Manual</i>	M46-01		n/a
WSDOT	<i>Qualified Product List</i>	n/a		n/a

### 2.7.3 Performance Requirements

Design-Builder shall perform analyses and prepare a design using the criteria specified within this Section, and produce pavement that meets the following performance requirements:

1. Provide a pavement design life of 50 years for Portland cement concrete (PCC) and HMA Pavements.
2. Provide a durable, long-lasting pavement system with the specified structural capacity; skid resistance, and superior ride quality.
3. Include pavement-to-structure transition areas as a part of ride quality.
4. Minimize pavement-to-structure transition deviations.
5. Utilize materials that meet Specification requirements.
6. Provide pavements with no identifiable distress.
7. See Section 2.30 (Pavement Warranties) for additional warranty information.

#### 2.7.3.1 Pavement Type

Use WSDOT's "Preapproved Pavement Sections" or a Design-Builder designed pavement section for mainline I-5 to construct PCC pavements where widening existing PCC pavements and to construct HMA pavement where widening existing asphalt concrete pavements. Use Design-Builder designed pavement sections for other areas.

#### 2.7.3.2 Pavement Design Report

Design-Builder shall submit to WSDOT a pavement design report to WSDOT for approval detailing the pavement designs for the Project prior to any to the Department prior to any paving operations. Any unstable slope areas or subgrade soil conditions shall be stabilized

before pavement construction. The pavement report shall also address subsurface drainage under the pavement section, and any transition requirements between differing sections to avoid trapping water in discontinuous pavement layers. Pavement design shall accommodate transverse moisture flow across the top of subgrade without vertical discontinuities.

### **2.7.3.3 Removal of Existing Pavement Sections**

Where existing pavement section is encountered vertically below where new pavement is being constructed, prior to the placement of the pavement section, all existing pavement sections shall be removed. Where pavement section is removed, vertical saw cuts will be necessary to prevent undermining of the adjacent lanes.

Where existing asphalt treated base or unfinished concrete pavement is encountered vertically below new asphalt or concrete pavement sections, the underlying pavements may be incorporated into the proposed pavement section, if shown to be structurally adequate. If removal is required, vertical sawcuts will be necessary to prevent undermining of adjacent lanes.

### **2.7.3.4 Ramps**

See reference drawings and electronic cross sections for approximate limits and quantities for this Work. Parameters for widening of ramps, ramp shoulders, or city streets not defined shall conform to the Section for Widening of Existing Pavement.

### **2.7.3.5 City Streets**

Design and construct local street to meet the requirements of the City of Everett Roadway Standards.

### **2.7.3.6 Pavement Resurfacing**

Any existing asphalt concrete pavement within the Project limits that is not slated for reconstruction, shall be resurfaced by roto-milling to a depth of 0.15' and then inlaid with 0.15' HMA compacted depth to reconstruct the Superelevations and the lane cross slopes within the Asphalt Pavement Limits. Transverse butt joints, at a depth of 0.15', shall be provided at the beginning and ending Project limits to accommodate the overlay. Butt joints shall be tapered from 0.15' to 0.00' in no less than 30 feet.

The second sentence of the first paragraph of section 5-04.3(10)A of the WSDOT Standard Specifications is revised to read as follows:

The completed course shall be free from ridges, ruts, humps, depressions, objectionable marks, or irregularities (including but not limited to cyclic density defects) and in conformance with the line, grade and cross section required by the Contract or as established by the Design-Builder. The evaluation procedure for identifying cyclic density defects is included in Appendix B6.

### **2.7.3.7 Roadway Shoulders**

Preliminary information indicates that the structural section of the existing shoulders may not be adequate for sustained traffic operations. Specific attention is drawn to construction phasing, and the temporary use of portions of the existing shoulders as travel lanes. If the Design-Builder chooses to use portions of the existing shoulders as travel lanes for maintenance of traffic, the shoulders may sustain damage. Any damage to existing shoulders, that are not intended to be replaced, shall be repaired prior to pavement resurfacing. Where existing asphalt shoulders are next to concrete mainline, the asphalt shall be replaced with concrete shoulders, unless 1) no widening is done on that side of the roadway, and 2) the shoulders are repaired, roto-milled to a depth of 0.15' and inlaid with 0.15' HMA.

The new shoulders for mainline pavement shall be constructed with the equivalent depths of HMA or PCCP in addition to the base as the adjacent travel lanes. See RFP Appendix V for coring data of the existing shoulders.

### **2.7.3.8 Pavement Surface Smoothness**

The following specifications shall apply to existing Portland Cement Concrete Pavement grinding:

- 95% of the surface area of the pavement to be ground shall have a minimum of 0.01 foot removed by grinding.
- The pavement shall be ground in a longitudinal direction beginning and ending at lines normal to the pavement centerline unless otherwise provided for in the contract. The minimum overlap between longitudinal passes shall be 2 inches.
- The right travel lane in the direction of travel shall be ground first.
- Prior to opening to traffic, the design-Builder shall remove any grindings and dust from the ground pavement by washing or brooming to meet permit requirements.
- Removal of the grinding residue from the immediate roadway shall be accomplished on a continual basis. Slurry will not be allowed to drain across open traffic lanes and shoulders. Slurry shall not be allowed to drain into any waterway, placed on the roadway slope within 200 feet of any waterway, or other areas that would create a potential for a permit violation. The Design-Builder shall prepare a plan to prevent contaminants, such as grinding slurry or concrete debris, from entering ditches, culverts, or other waterways including wetlands. Five business days prior to commencing the grinding operation, the Environmental Compliance Manager shall submit the plan to WSDOT for review and comment. WSDOT comments shall be incorporated into the plan, or a justification shall be sent WSDOT for not incorporating them. The Environmental Compliance Manager shall approve the plan by signature and Professional Engineer's stamp on the document.

- Concrete slurry shall be collected from the roadway and disposed of by the Design-Builder off the project site. The Design-Builder is responsible for all costs associated with removal and disposal of diamond grinding slurry.
- Bridge decks and bridge overlay insets shall not be ground. The ground pavement shall be feathered to match the elevation of these features.

Sections 5-04.3(13) and 5-05.3(12) of the WSDOT Standard Specifications are deleted in their entirety and replaced with the following:

This project will utilize the targeted International Roughness Index (IRI) Value as the basis for pavement surface smoothness. The entire length of each through lane, auxiliary lane, passing lane, bridge approach and bridge deck, shall be profiled from the beginning to the end of the project. Ramps, shoulders and tapers shall not be profiled and will not be subject to incentive/disincentive adjustments unless otherwise noted in the contract.

The completed surface of all Hot Mix Asphalt (HMA) courses shall be of uniform texture, smooth, uniform as to crown and grade and free from defects of all kinds. The completed surface of the HMA wearing course or Portland Cement Concrete Pavement (PCCP) shall not vary more than 1/8 inch from the lower edge of a 10 foot straightedge placed on the surface parallel to the centerline. The transverse slope of the completed surface of the HMA or PCCP shall vary not more than 1/4 inch in 10 feet from the rate of transverse slope shown in the plans. Areas that do not meet these requirements shall be marked and shall be corrected by one of the following methods:

1. Diamond grinding until the area meets the 1/8-inch in ten feet and transverse requirements, or
2. Removal and replacement of the wearing course of HMA, or
3. By another method approved by the WSDOT Engineer.

A standard milling machine will not be allowed for corrective action of areas that do not meet the parallel to centerline or transverse slope requirements.

The profile of bridge decks within the project limits shall be excluded in the IRI disincentive payments as defined below. When PCCP abuts bridges, the finished pavement parallel to centerline within 15 feet of the abutting joint shall be uniform to a degree that no variations greater than 1/8 inch are present when tested with a 10-foot straightedge. Bridge decks paved with HMA shall meet the 10-foot straight edge requirements. If the WSDOT Engineer determines that corrective work is required in this area, the Design-Builder shall complete this to meet the 1/8 inch in 10 feet and transverse slope requirements at no cost to the WSDOT.

IRI testing will be performed by WSDOT. Upon the completion of the paving operation, the Design-Builder will notify the WSDOT Engineer when the roadway is ready for testing. This will be after all corrective action has been completed. The WSDOT Engineer will inspect the roadway to ensure it can be driven safely at the posted speed limit. If requested by the

WSDOT Engineer, the Design-Builder shall sweep the roadway at no additional expense immediately prior to testing.

Weather permitting, IRI testing will be completed within twenty working days of the Design-Builder notification that the roadway is ready for testing. The WSDOT Engineer will notify the Design-Builder of the results within 3 working days after the test is completed. No testing will be done if the roadway has standing water, if it is raining or other weather conditions exist which are determined by the WSDOT Engineer to be inclement.

### Existing Pavement Conditions

During the last review of this roadway, which was conducted during July, 2004 by the WSDOT, the following IRI (inches/mile) values were obtained. The IRI values are informational only and are averaged IRI values for 1- mile sections. Additional information is available from the WSDOT Engineer.

SR	Begin Milepost	End Milepost	IRI Ave NB (Inch/mile)	IRI Ave SB (Inch/mile)
5	195.00	194.00	129	134
5	194.00	193.00	150	178
5	193.00	192.00	154	101
5	192.00	191.00	126	82
5	191.00	190.00	82**	101*
5	190.00	189.00	77**	90*
5	189.00	188.00	84**	84*
5	188.00	187.00	72**	95*

\* Left and middle lanes only.

\*\*Left and Right lanes only.

### Corrective Action

The Design-Builder shall use suitable equipment to identify all areas that exceed 1/8 inch in ten feet and transverse slope requirements. Suitable equipment includes a ten-foot straightedge, lightweight profilers or other devices that are capable of locating areas that require corrective action.

Areas exceeding the 1/8 inch in ten feet parallel to centerline or 1/4-inch in ten feet transversely shall be marked and shall be corrected by one of the following methods:

1. Diamond grinding until the area meets the 1/8 inch in ten feet and transverse requirements, or
2. Removal and replacement of the wearing course of HMA, or

3. By another method approved by the WSDOT Engineer.

A standard milling machine will not be allowed for corrective action of areas that do not meet the parallel to centerline or transverse slope requirements.

The exact location for corrective action shall be determined by the Design-Builder and the location marked on the pavement before corrective action commences. The area that is repaired/ corrected shall be checked by the Design-Builder to ensure that the area meets specifications.

Corrective actions or repairs shall not reduce planned pavement thickness by more than 1/4 inch.

All corrective work shall be completed at the Design-Builder's expense. If correction of the roadway as listed above can bring the IRI value below 95 or will not produce satisfactory results as to smoothness and serviceability, the WSDOT Engineer may accept the completed pavement and shall deduct from monies due or that may become due to the Design-Builder the sum of \$500.00 for each and every section of single traffic lane 100 feet in length in which any deviations as described above are found. Under the circumstances described above, the decision whether to accept the completed pavement or to require corrections as described above shall be vested entirely in the WSDOT Engineer.

When utility appurtenances such as manhole covers and valve boxes are located in the traveled way, the roadway shall be paved before the utility appurtenances are adjusted to the finished grade.

When PCCP is to be placed on HMA, the surface tolerance of the HMA shall be such that no surface elevation lies above the plan grade minus the specified plan depth of PCCP. Prior to placing the PCCP, any such irregularities shall be brought to the required tolerance by grinding or other means approved by the WSDOT Engineer.

#### **2.7.3.9 Ramps, Shoulders, and Tapers**

The completed surface smoothness of all courses of HMA and of PCCP for ramps, shoulders and tapers shall be of uniform texture, smooth, uniform as to crown and grade, and free from defects of all kinds. The completed surface of the HMA wearing course or PCCP shall not vary more than 1/8 inch from the lower edge of a ten-foot straightedge placed on the surface parallel to the centerline. The transverse slope of the completed surface of the HMA wearing course or PCCP shall not vary more than 1/4 inch in ten feet from the rate of transverse slope required by the Contract. Deviations in excess of the above tolerances shall be removed in accordance with the methods identified in section 2.7.3.8, Pavement Surface Smoothness.

Deviations on ramp lanes in excess of the above tolerances that result in a low spots in the HMA or PCCP and deviations resulting from a high place where corrective action, in the opinion of the WSDOT Engineer, will not produce satisfactory results will be accepted with

a price adjustment. The WSDOT Engineer shall deduct from monies due or that may become due the Design-Builder the sum of \$500.00 for each and every section of traffic lane 100 feet in length in which any excessive deviations described above are found.

When utility appurtenances such as manhole covers and valve boxes are located in the traveled way, the roadway shall be paved before the utility appurtenances are adjusted to the finished grade. Utility appurtenances (including manhole covers) are not allowed in lanes of mainline I-5.

## **2.7.4 Design and Construction Criteria**

### **2.7.4.1 Design Criteria**

Design-Builder shall design the pavement sections with the following parameters:

1. Pavement sections for ramps beginning at the gore, shall be designed to accommodate 40 million ESALs for all lanes combined of a given ramp. The Design-Builder shall apply the appropriate lane distribution factor to each lane of the ramp. All other pavement sections shall be designed to accommodate 200 million ESALs for North Bound I-5 (all NB lanes combined) and 200 million ESALs for South Bound I-5 (all SB lanes combined). The Design-Builder shall apply the appropriate lane distribution factor to each lane.
2. The depth of the structural section of the mainline shoulders shall be equal to the depth of the structural section of the adjacent mainline traveled lanes.
3. The depth of the structural section of the ramp shoulders shall be equal to the depth of the structural section of the adjacent ramp traveled lanes and shall have a minimum HMA depth of 0.30 ft.
4. For the new and widened pavement sections, provide for surface and subsurface drainage to eliminate trapped water. If necessary, provide an underdrain system to adequately drain the pavement section. For base course drainage, collector systems, and outlets, meet FHWA Guidelines (RD-72-30).
5. The Design-Builder shall make adjustments to the minimum layer thickness to accommodate climatic conditions such as frost depth. A total minimum pavement depth (HMA and base) of 12 inches is required to minimize the effects of freeze-thaw cycles.
6. If existing or newly constructed shoulders are utilized as temporary detour/staging routes then the Design-Builder shall construct or reconstruct them to accommodate the anticipated ESAL's to avoid incurring pavement distress.
7. Provide bridge approach slabs, where required.

8. It will be the responsibility of the Design-Builder to ensure that the longitudinal joint from pavement widening does not reflect through the HMA overlay. Reflective cracking of the longitudinal joint shall be in accordance with Section 2.30 (Warranties).
9. Continuously reinforced PCC pavement shall not be used.
10. PCC pavement shall be designed with a maximum joint spacing of 15 feet utilizing perpendicular joints. Include dowel bars at all transverse joints.

Dowel bar alignment shall be initially validated on pavement produced using production equipment by coring or other destructive testing process. Once dowel bar alignment has been verified and is within specification, dowel alignment may be verified through the use of the MIT Scan or equivalent device (accuracy of device must be confirmed through coring). Dowel bar alignment tolerances are listed in Standard Specification 5-05.3(10). In addition, dowel bars shall be free of surface irregularities or any signs of corrosion.

#### **2.7.4.2 Pavement Design**

For design of the PCC and HMA pavement sections, Design-Builder shall use a Professional Engineer registered in the State of Washington with at least two years of experience in pavement design. The Design-Builder's plan shall, provide for construction of pavements within the Project limits. Design-Builder shall use information regarding subsurface conditions and existing pavement sections at the Design-Builder's discretion. Pavement sections shall be designed for the anticipated traffic (including percent increases) provided in the Environmental Documentation in RFP Appendix E and the Access Point Decision Report in RFP Appendix I.

#### **2.7.4.3 Pavement Materials**

Pavement Materials shall meet the requirements of WSDOT *Standard Specifications* in addition to the following requirements:

1. The pavement base material shall not be cement treated base.
2. Asphalt millings shall not be used as a base aggregate beyond that allowed in WSDOT Standard Specifications.
3. The base material, if crushed stone, shall contain less than 7 percent passing the No. 200 sieve and have a minimum resilient modulus (T-307 modified- see WSDOT Materials Manual) of 25,000 psi.
4. All transverse joints for new concrete roadway shall be constructed with stainless steel clad dowel bars (or approved equal) in accordance with WSDOT Standard Plan

A-1.

5. Dowel bars for dowel bar retrofitting may use epoxy coated dowel bars.
6. All permanent HMA shall be designed and constructed to meet the requirements of Standard Specification 5-04 and shall use asphalt binder PG 64-22.

Use only materials that meet or exceed the requirements established by the Technical Specifications.

#### 2.7.4.4 Widening of Existing Pavement

Most of the Project limits will require pavement widening to accommodate full lane and shoulder width standards and the additional travel lane for NB and SB I-5 – see reference drawings and electronic cross sections for approximate limits and quantities for this Work. Additional Crushed Surfacing Base Course (CSBC) depth may be necessary at some locations to eliminate the potential for constructing a bathtub section for subsurface drainage. Existing pavement sections shall be removed from areas where new pavement is constructed. Prior to the removal of pavement sections, vertical cuts will be necessary to prevent the undermining of the adjacent lanes.

#### 2.7.4.5 Dowel Bar Retrofit

The Acceptability of dowel bar retrofit patch material shall be determined by WSDOT on the basis of the following:

- Concrete patching materials shall be prepackaged patching mortar extended with aggregate.
- The amount of aggregate for extension shall conform to the manufacturer's recommendation. This material may be used for partial depth spall repair, panel replacement and dowel bar retrofit.
- Prepackaged patching materials (mortar) and extended patching materials (concrete) shall be cementitious material and meet the following requirements:

**Table 2.7.3**  
**Patching Material Specifications**

Characteristics Test Method	Requirements	
Patching Mortar & Grout		
<b>Compressive Strength</b>		
at 3 hours	ASTM C-109	Minimum 3,000 psi
at 24 hours	ASTM C-109	Minimum 5,000 psi
<b>Length Change</b>		
at 28 days	ASTM C-157	0.15 percent maximum
Total Chloride Ion Content	ASTM C-1218	1 lb/yd <sup>3</sup> maximum
<b>Bond Strength</b>		

at 24 hours	ASTM C-882 (As modified by ASTM C-928, Section 8.5)	Minimum 1,000 psi
Scaling Resistance (at 25 cycles of freezing and thawing)	ASTM C-672 (As modified by ASTM C-928, Section 8.4)	1 lb/ft <sup>2</sup> maximum

**Table 2.7.4**  
**Extended Aggregate Specifications**

<b>Compressive Strength</b>		
at 3 hours	ASTM C-39	Minimum 3,000 psi
at 24 hours	ASTM C-39	Minimum 5,000 psi
<b>Length Change</b>		
at 28days	ASTM C-157	0.15 percent maximum
<b>Bond Strength</b>		
at 24 hours	ASTM C-882 (As modified by ASTM C-928, Section 8.5)	Minimum 1,000 psi
Scaling Resistance (at 25 cycles of freezing and thawing)	ASTM C-672	2 Maximum Visual Rating
Freeze thaw	ASTM C 666	Maximum expansion 0.10% Minimum durability 90.0%

1. Aggregate for extension material shall meet the requirements of Standard Specifications Section 9-03.1(4) (RFP Appendix B5) and be AASHTO Grading No. 7.
2. The Grout manufacturer shall use the services of an accredited laboratory that has an equipment calibration verification system and a technician training and evaluation process per AASHTO R-18. Mitigation for Alkali Silica Reaction (ASR) will not be required for the extender aggregate used for concrete patching material.

WSDOT Standard Specification Section 9-07.5 is supplemented with the following:

Stainless steel type dowel shall conform to WSDOT Standard Specification Section 9-07.5 in addition to the following options:

- (A) 316L Stainless Steel Clad Bars with a minimum outside diameter of 1.5 inches and a length of 18 inches. The bars shall have a 0.06 inch minimum cladding over AASHTO M 31 or AASHTO M 255 Grade 60 steel.

- (B) 316L Stainless Steel Tubes with a minimum outside diameter of 1.5 inches and a length of 18 inches. The tubes shall have a minimum wall thickness of 0.06 inches and shall be press-filled with AASHTO M 31 or AASHTO M 255 Grade 60 steel. A lubricant/adhesive shall be used between the tube and the carbon steel to fill and voids.
- (C) 316L Solid Stainless Steel Bars with a minimum outside diameter of 1.5 inches and a length of 18 inches.

The surface of the finished cut to length dowels shall be provided with a smooth “ground” or “cold drawn” finish acceptable to WSDOT. All mill scale shall be removed from the surface of the finished dowel. The dowel bar ends shall be sealed with a patching material (primer and finish coat) used for patching epoxy coated reinforcing steel.

The contractor shall furnish a Manufacturer’s Certificate of Compliance per Standard Specification 1-06.3, including mill test report verifying conformance to the aforementioned specifications as well as written certification identifying the patching material used at cut dowel bar ends.

Any stainless steel type dowel delivered to the project that displays rusting, pinholes or questionable blemishes shall be rejected.

Only one stainless steel type option will be allowed per project; intermixing of different dowel types will not be allowed.

#### **2.7.4.6 Submittals**

Refer to Section 2.25 (Control of Material) for pavement submittal requirements.

## **2.8 ENVIRONMENTAL**

### **2.8.1 General**

The Design-Builder shall complete the Project in a manner that avoids or minimizes social, economic and environmental impacts to the extent practicable. WSDOT has determined that the I-5 mainline and ramp Work can be completed with minimal impact on the aquatic environment. The Design –Builder shall obtain all required permit approvals unless the Contract specifically indicates WSDOT will acquire the permit.

The Design-Builder shall implement the Project’s environmental protection commitments in accordance with the Environmental Documents and permits. The Design-Builder shall establish a goal of meeting or exceeding environmental requirements with no permit violations.

The principal Environmental Documents for this Project, located in RFP Appendix E, are:

1. NEPA Environmental Assessment (EA) for I-5 Everett HOV, SR 526 to SR 2, September 2004
2. NEPA Finding of No Significant Impact (FONSI) for I-5 Everett HOV, November 12, 2004
3. SEPA Adoption of NEPA EA for I-5 Everett HOV, November 12, 2004

## 2.8.2 Mandatory Standards and Reference Documents

### 2.8.2.1 Mandatory Standards

**General.** Design-Builder shall design and construct the roadway in accordance with the requirements of the Mandatory Standards listed in Table 2.8.1. The documents in Table 2.8.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of this RFP unless modified by Addendum or Change Order.

**Table 2.8.1**  
**Mandatory Standards**

Agency or Author	Title	Document or Report No.	Date	Comments, Short Forms
CEQ	National Environmental Policy Act of 1969			
ACHP	36 CFR 800 - Protection of Historical and Cultural Properties			
FHWA	23 CFR 771 - Environmental Impact and Related Procedures			
FHWA	23 CFR 772 - Procedures for the Abatement of Highway Traffic Noise and Construction Noise			
FHWA	FHPM 7-7-9 - Air Quality Guidelines			
	Endangered Species Act of 1973, and supplements			
	Executive Order 11990 (Protection of Wetlands)			

	Executive Order 11988 (Floodplain Management)			
ACHP	National Historic Preservation Act of 1972			
FHWA	Section 4(f) of the Department of Transportation Act of 1966			
Dept. of Army	Section 404 of the Clean Water Act of 1977 (33CFR320-330)			
NRCS	Federal Farmlands Protection Policy Act of 1981			
EPA	Section 1424(e) of the Safe Drinking Water Act (Sole Source Aquifer Review)			
	36 CFR 60 – Determinations of Eligibility for Inclusion in the National Register of Historic Places			
	Public law 91-646 - Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970			
EPA	Resource Conservation and Recovery Act (RCRA)			
EPA	Comprehensive Environmental Response, Compensation and Liability Act of 1980 (CERCLA)			
EPA	Superfund Amendments and Reauthorization Act (SARA)			
Ecology	Section 402 Clean Water Act (NPDES)			
Ecology	State Water Pollution Control Act			
WDFW	State Hydraulic Code			
WSDOT	Statewide Traffic Noise Analysis Abatement Policy & Procedures			
Ecology	Model Toxics Control Act			
Ecology	Underground Storage Tank Act			
	Integrated Pest Management			
CTED	Growth Management Act			
Ecology	Shoreline Management Act			
WDNR	Forest Practices Act			
Everett	Shoreline Management Master Program			
Everett	Sensitive Areas Ordinance			
Everett	Chapter 20.08 Noise Control			
WSDOT	Chapter 173-60 WAC Maximum Environmental Noise Levels			

### 2.8.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.8.2 as supplementary guidelines for the design and construction of the roadway. These Reference Documents have no established order of precedence.

**Table 2.8.2**  
**Reference Documents**

Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	WSDOT Environmental Procedures Manual	M31-11		
WSDOT	WSDOT Highway Runoff Manual	M31-16	2004	
WSDOT	WSDOT Hydraulics Manual	M23-03		
WSDOT	WSDOT Design Manual for Design-Build Projects	M22-02		
WSDOT	High Visibility Fence Memorandum	Project Delivery Memo #04-04	8-11-04	

### 2.8.2.3 Interagency Agreements and Memoranda

WSDOT has entered into several interagency agreements with federal and state agencies, which serve to provide guidance and clarifications for meeting regulatory requirements. The Design-Builder shall comply with the Implementing Agreements and Memoranda of Understanding or Agreement identified in Table 2.8.3 as they apply to any of the Work.

**Table 2.8.3**  
**Interagency Agreements and Memoranda**

Agency or Author	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT Ecology	Implementing Agreement Between the Washington State Department of Ecology and WSDOT Regarding Compliance with the State of Washington Surface Water Quality Standards		February 1988	
WSDOT WDFW	Memorandum of Agreement Between Washington State Department of Fish and Wildlife and WSDOT Concerning Construction Projects in State Waters		June 2002	
WSDOT Ecology	Implementing Agreement Between the Washington State Department of Ecology and WSDOT		April 1993	

	Concerning Hazardous Waste Management			
WSDOT PSCAA	Memorandum of Agreement between WSDOT and the Puget Sound Clean Air Agency Regarding the Control of Fugitive Dust from Construction Projects		December 1999	
WSDOT WDFW	Memorandum of Agreement between WSDOT and the Washington State Department of Fish and Wildlife Regarding Fish Passage Guidelines: Culvert Installations		August 1990	
WSDOT Ecology	Implementing Agreement Between the Washington State Department of Ecology and WSDOT Concerning Wetlands Protection and Management		July 1993	
WSDOT, et al	Memorandum of Agreement on the WSDOT Wetland Mitigation Bank Program		October 1998	
WSDOT	WSDOT Environmental Compliance Assurance for Construction Projects and Activities Instructional Letter	IL4055.02	August 2004	

## 2.8.3 Performance Requirements

### 2.8.3.1 Environmental Compliance Plan

The Design-Builder shall prepare and implement an Environmental Compliance Plan, which shall be incorporated in the Quality Management Plan that identifies all applicable environmental permits and approvals, identifies key personnel roles and responsibilities, identifies procedures for environmental compliance, establishes procedures for identifying and correcting non-compliance and establishes procedures for emergency response.

The Environmental Compliance Plan shall include the following plus others deemed appropriate by the Design-Builder in order to achieve environmental compliance:

1. Environmental Personnel and Training
2. Compliance Monitoring and Reporting
3. Environmental Plans and Strategies
4. Plan to obtain or finalize all environmental permits not obtained or finalized in the Contract.

The Design-Builder shall comply with all applicable laws and shall obtain all required permits, orders, and authorizations related to the Work, except as otherwise noted in this Section. WSDOT has conducted certain environmental studies pertaining to this Project. WSDOT has provided the FONSI (RFP Appendix E17) and all technical studies and concurrences supporting the FONSI. Permits required for construction of the Work, as scoped, are identified in the Contract Documents.

Work conducted in potentially environmentally sensitive areas not identified in the Environmental Assessment will require that the Design-Builder obtain appropriate studies to identify the environmental issues and impacts caused by the changed Work. The Design-Builder shall promptly perform required environmental studies and obtain all environmental permits, orders, and authorizations. The Design-Builder is responsible for EA re-evaluation required for the changed Work. The Design-Builder shall submit to the Department copies of all environmental studies/reports, permit applications and permits obtained.

Additional permits may be required by federal, State, or local authorities depending on the Design-Builder's design and technical approach.

Neither the Design-Builder's permit applications nor their supporting documents shall obligate WSDOT to future monitoring activity within the Project Site nor suggest use of WSDOT-owned or controlled property to accomplish mitigation activities without prior approval of WSDOT.

Requests for approval must be submitted to WSDOT a minimum of 15 Calendar Days in advance of submittals to the permitting agency.

### **Regulatory Agencies**

Design-Builder shall consult specifically with the following agencies if proposing Work outside the boundaries of the Project Site regarding required permits, Work constrictions, and other special considerations:

U.S Army Corps of Engineers  
Kate Stenberg  
P.O. Box 3755  
Seattle, WA 98124-2255  
(206) 764-6912

National Oceanic and Atmospheric Administration – Fisheries  
Neil Rickard  
7600 Sand Point Way NE, Bldg. 1  
Seattle, WA 98115  
(360) 753-9090

U.S. Fish and Wildlife Service  
Jennifer Quan  
510 Desmond Drive. SE, Suite 102  
Lacey, WA 98503

(360) 753-6047

Washington Department of Fish and Wildlife  
Jim Fraser, Multi-Agency Permitting Team  
3190 – 160<sup>th</sup> Ave. S.E.  
Bellevue, WA 98008  
(425) 649-7003

Washington Department of Ecology  
Penny Kelley, Multi-Agency Permitting Team  
3190 – 160<sup>th</sup> Ave. S.E.  
Bellevue, WA 98008  
(425) 649-7181

Washington Department of Ecology  
Joe Hickey  
Toxic Cleanup Program  
3190 – 160<sup>th</sup> Ave. S.E.  
Bellevue, WA 98008  
(425) 649-7202

City of Everett  
Steve Ingalsbe  
2930 Wetmore Ave.  
Everett, WA 98201  
(425) 257-8941

### **2.8.3.1.1 Environmental Personnel and Training**

#### **2.8.3.1.1.1 Personnel**

The Design-Builder shall identify and assemble an Environmental Oversight and Monitoring team, under the direction of an Environmental Compliance Manager, prior to definitive Design Review and prior to the start of construction. This team shall be to oversee the implementation of mitigation measures and Project commitments, and to monitor construction activities to ensure that impacts beyond those described in the Environmental Assessment and environmental permits do not occur.

The Design-Builder must include individuals on the Environmental Team capable and qualified to perform the following types of investigations and activities:

1. Environmental investigations to determine the effect of the Project (design elements and construction activities) on terrestrial and aquatic biological resources, cultural resources, visual and aesthetic conditions, water quality, Environmental Justice, and other issues present within the Project area.

2. Preparation of biological, environmental, and cultural documents consistent with FHWA and WSDOT policies and procedures.
3. Completion of applications for required environmental permits
4. Development and implementation of plans to mitigate impacts to wetlands, wildlife and wildlife habitat, water quality, visual and aesthetic resources, cultural resources, especially as related to slope cuts and fill embankments, revegetation and tree replacement, and other similar issues.
5. Oversight and compliance monitoring for regulatory permits including wetlands and water quality in accordance with WSDOT Instructional Letter 4055.02.
6. Train Design-Builder's staff on environmental protection and compliance procedures.
7. Other environmental activities as determined necessary by an environmental oversight team consisting of WSDOT and FHWA representatives. If these activities are not contained in or reasonably inferred by the Contract Documents (including the Design-Builder's Proposal) or applicable laws and regulations, such other environmental activities is part of the Work unless WSDOT concurs that it is not.

An Environmental Compliance Manager is among the Design-Builder's key personnel and shall be directly responsible to the Design-Builder's Project Manager. Lead personnel with the Environmental Team shall have experience with highway engineering drawings and concepts and be capable of communicating with and working cooperatively and effectively with design engineers, construction staff, resource and local agencies, and the general public. The lead person for the Environmental Team shall have prior experience in the areas of construction oversight and environmental monitoring. The Environmental Team lead shall work closely with the Public Involvement Specialist and Community Relations Specialist.

Key personnel with the Design-Builder including the Project manager, environmental coordinator, and other lead personnel shall participate in a pre-design and construction environmental task force to discuss environmental, cultural, and community issues. The Design-Builder is responsible for organizing, hosting, and leading the conference.

The Department will provide an independent environmental oversight team to assure that all environmental commitments are adhered to by the Design-Builder. It is expected that the Design-Builder's environmental team and the Department environmental team will consult on a regular and frequent basis regarding the implementation of environmental commitments and mitigation measures.

The Design-Builder shall be responsible for obtaining environmental and cultural resources clearances for all Design-Builder-located areas and activities including but not limited to material pits, staging yards, haul roads, etc. Material changes to the highway alignment that result in environmental, cultural, or community impacts beyond those identified in the

Environmental Assessment will not be allowed without the prior written consent of WSDOT and FHWA. All changes shall be supported by the necessary investigations, documentation, and approvals of applicable resource management agencies. Time and cost implications resulting from material changes for the convenience of the Design-Builder shall be borne by the Design-Builder.

As part of the Environmental Compliance Plan, the Environmental Compliance Manager shall develop, document, and implement an Environmental Communication Protocol for environmental compliance. The Environmental Communication Protocol shall define compliance roles, responsibilities, and communication procedures. WSDOT will make the Roles and Responsibilities Agreement available to the resource agencies.

The Environmental Communication Protocol shall identify points-of-contact for emergency response and for implementation of design changes, environmental performance specifications, best management practices, and compliance procedures. The communication plan shall clearly identify the appropriate contacts for reporting problems and potential violations of environmental regulations and/or environmental performance specifications. Information required for each point-of-contact includes name, responsibility, office, 24-hour and mobile telephone numbers, e-mail address, and Work address.

#### **2.8.3.1.1.2 Training**

Design-Builder shall develop and implement an environmental protection and training program for the Design-Builder's design and construction staff and shall be responsible for all actions of any of their staff persons adversely affecting the environment.

The training program shall orient employees and Sub-contractor's to the following:

1. The overall importance of environmental issues in achieving a successful Project
2. The particular environmental sensitivities of the Project
3. Erosion and Sediment Control procedures
4. Environmental Compliance Reporting Procedures
5. Emergency Response

The Environmental Compliance Manager shall notify WSDOT of the training sessions and allow WSDOT personnel to participate.

#### **2.8.3.1.2 Compliance Monitoring and Reporting**

The Design-Builder shall develop and implement an Environmental Compliance Monitoring and Reporting Program to confirm that all permit conditions and environmental clearances and authorizations are being met, that the applicable environmental performance specifications are being followed, and that the environmental performance specification are achieving their stated goals. This program shall outline the anticipated monitoring schedule and reports required for each stage of Project construction including Pre-Construction. The Environmental Compliance Monitoring and Reporting Program shall comprise a section of the Environmental Compliance Plan.

### **2.8.3.1.3 Environmental Plans and Strategies**

#### **2.8.3.1.3.1 Temporary Erosion and Sediment Control Plan (TESC)**

This plan is intended to prevent, control, and stop erosion and water pollution within the Project, thereby protecting the Work, nearby lands, streams, and other bodies of water, including wetlands.

##### **Requirements**

Controlling pollution, erosion, run-off, and related damage will require the Design-Builder to perform temporary Work items including but not limited to:

1. Providing ditches, berms, culverts, and other measures to control surface water
2. Building dams, settling basins, energy dissipaters, and other measures, to control downstream flows
3. Controlling underground water found during construction
4. Covering or otherwise protecting slopes until permanent erosion-control measures are working

Before any Work begins, the Design-Builder shall submit a (TESC) plan and implement temporary water pollution/erosion control measures according to the provisions of the Contract Documents. The plan shall show the schedule for all erosion-control Work, whether permanent as required by the Contract or temporary as proposed by the Design-Builder. The plan shall cover all areas the Design-Builder's Work may affect inside and outside the limits of the Project (including all WSDOT-provided sources, disposal sites, and haul roads, and all nearby land, streams, and other bodies of water). Before this plan has been reviewed, the Design-Builder shall do no clearing and grubbing or earthwork unless the Department approves in writing.

If natural elements rut or erode the slope, the Design-Builder shall restore and repair the damage, with the eroded material where possible, and clean up any remaining material in ditches and culverts. The Design-Builder shall schedule the Work so that grading and permanent erosion control immediately follows clearing and grubbing. If conditions prevent such scheduling, temporary control measures will be required between Work stages.

The area of excavation, borrow, and embankment Work shall not exceed the Design-Builder's ability to meet the schedule for finish grading, mulching, seeding, and other permanent erosion control Work.

Temporary control measures are required if it appears pollution or erosion may result from weather, the nature of the materials, or progress on the Work.

#### **2.8.3.1.3.2 Spill Prevention, Control and Countermeasures Plan**

This Work shall consist of preparing Spill Prevention, Control and Countermeasures (SPCC) Plan and implementation of the plan.

**Requirements**

The Design-Builder shall be responsible for the preparation of an SPCC plan in accordance with the Highway Runoff Manual to be used for the duration of the Project. The plan shall be submitted to the Department prior to the commencement of any construction activities. A copy of the plan with any updates shall be maintained at the Work Site by the Design-Builder.

The SPCC plan shall identify construction-planning elements and recognize potential spill sources at the Site. The Plan shall outline responsive actions in the event of a spill or release and shall identify notification and reporting procedures. The Plan shall also outline Design-Builder management elements such as personnel responsibilities, Project Site security, Site inspections and training.

The Design-Builder shall maintain, at the Site, the applicable equipment and material designated in the SPCC Plan.

**2.8.4 Design and Construction Criteria (Commitments)****2.8.4.1 NEPA/SEPA Documentation**

A NEPA Environmental Assessment and SEPA Adoption have been prepared and circulated which address the scope, impacts and mitigation for the Project. Changes to the Project proposed by the Design-Builder will require an environmental reevaluation to determine the adequacy of the existing Environmental Documents. A supplement to the Environmental Assessment or an Environmental Impact Statement may be required if the Project impacts increase to the point where the Project becomes controversial or the impacts approach significance. The Design-Builder will be responsible for preparation of this additional environmental documentation and assumes all risk associated the proposed change.

The environmental reevaluation requirements for this Project shall follow the procedures and requirements established in the WSDOT Environmental Procedures Manual and 23 CFR 771. It is anticipated that the environmental reevaluation and related approvals will not be required provided changes in roadway alignments and grades are negligible and resultant social, economic and environmental affects are not appreciably changed. Coordination with Stakeholder agencies shall occur as part of any reevaluation process. Final determination regarding the necessity of environmental reevaluations will be made by the WSDOT and FHWA.

All environmental reevaluations will be subject to written approval by WSDOT.

**2.8.4.2 Environmental and Permit Commitments**

WSDOT is in the process of obtaining the Project permits listed in Table 2.8.4. The status and conditions of the permit not obtained by WSDOT 30 days prior to the submittal of the

Proposals will be sent to the Proposers via a RFP Addendum. The Design-Builder shall complete the permit process for any permits not completed by WSDOT prior to the Proposal due date.

The Design-Builder shall meet with each permitting agency to review the means and methods in constructing the Project and to confirm understanding of permit requirements prior to permit related construction activity. The Design-Builder shall give notice to the Department 5 calendar days prior to all meetings with Permitting Agencies and provide the Department the opportunity to attend.

The Design-Builder is responsible for and shall obtain additional permits and approvals as necessary based on the proposed design.

Applications for any additional permits for which WSDOT is required to be the applicant shall be prepared by the Design-Builder. Draft permit applications for these permits shall be submitted to WSDOT for review at least 10 business days prior to the date the application is to be submitted. The Design-Builder shall be responsible for providing WSDOT with all necessary information, including environmental data and technical data for the roadway cross drainage-ways (i.e. typical sections, location and approximate areas of cut and fill within each drainage way) to support the determination of need for a permit and/or the permit application. The plans for permits shall be on 11"x17" sheets. The Design-Builder shall allow time in the Contract Schedule for processing the applications, after completed applications are received by WSDOT.

Permits for which WSDOT is not required to be the applicant shall be the responsibility of the Design-Builder. Construction activities may not begin until the appropriate environmental permits are issued.

Table 2.8.4 summarizes the environmental permits and corresponding approvals that WSDOT has obtained or is currently pursuing. Some permits may require the Design-Builder to complete the submittal and approval process. Permits not included in table 2.8.4 shall be the responsibility of the Design-Builder. No additional compensation will be due the Design-Builder for direct, indirect or schedule impact costs as the result of the work required to obtain permits. Note that the Wetland and Stream Alteration Review, the Wetland Buffer Reduction Review, and the Special Property Use Review are all covered in the Shoreline Substantial Development Permit and Special Property Use Permit.

**Table 2.8.4**  
**Environmental Permits and Approvals**

Permit or Approval	Agency or Governmental Entity with Jurisdiction	Status
Section 404 Nationwide Permit #18	U.S. Army Corps of Engineers	Complete
Section 401 Water Quality Certification (Letter of Verification)	Department of Ecology	Complete

State Environmental Policy Act (SEPA), Adoption	WSDOT	Complete
Hydraulic Project Approval	WDFW	Complete
Shoreline Substantial Development, Floodplain Development and Wetland Alteration	City of Everett	Complete
Wetland and Stream Alteration Review	City of Everett	Complete
Wetland Buffer Reduction Review	City of Shoreline	Complete
Special Property Use Review	City of Everett	Complete
National Historic Preservation Act, Section 106 Approval	SHPO/Tribes	Complete
Endangered Species Act, Section 7 Consultation	NOAAF/USFWS	Complete
National Environmental Policy Act(NEPA), Environmental Assessment (EA)	WSDOT/FHWA	Complete
NEPA EA, Findings of No Significant Impact (FONSI)	FHWA	Complete

### State

Extension of the in-water Work period requires approval by WDFW and also requires advance notice to the U.S. Fish and Wildlife Service (USFWS) and NOAA Fisheries. It shall be Design-Builder's responsibility to obtain approval from WDFW and notify the Department fifteen calendar days in advance of the need to obtain an extension. WSDOT will notify USFWS and NOAA Fisheries. No Work shall be allowed in the water or below the ordinary high water mark outside of the WDFW in-water Work period, unless it is effectively isolated from the potential wetted channel.

### Local

WSDOT has made application to the City of Everett for a Shoreline Management Substantial Development Permit and a Floodplain Development Permit for construction of Water Quality Site 1. These permits will also include review of the Wetland and Stream Alteration proposed at the Site. The City's permits are anticipated to be received in February 2005. The conditions of these permits will be included in an Addendum to the RFP.

### **2.8.4.3 Other Agreements and Commitments**

The NEPA Environmental Assessment, FONSI, and supporting technical studies contain commitments for completion of the Work. The Design-Builder shall ensure that the following commitments are adhered to or implemented:

#### **2.8.4.3.1 Air Quality**

##### **Construction Mitigation Measures**

The Design-Builder shall be responsible for preparing, implementing, and submitting a Fugitive Dust Control Plan. The plan shall identify activities that cause dust, measures planned to prevent dust, methods of inspection, staff responsible to implement the plan, and procedures for tracking and reporting. The Design-Builder must also comply with the Memorandum of Agreement between Puget Sound Clean Air Agency and WSDOT.

##### **Permanent Mitigation Measures**

No permanent mitigation measures are anticipated for air quality. However, the final Project design must meet air quality conformity requirements. The Design-Builder shall be responsible for doing all necessary Work to show and report that the proposal meets Project level air quality conformity. Hot-spot modeling and reporting by the Design-Builder at intersections built differently than proposed and previously modeled by WSDOT shall be completed as a part of the Work.

#### **2.8.4.3.2 Noise**

##### **Construction Mitigation Measures**

Design-Builder shall obtain a Noise Variance from the City of Everett for construction Work that exceeds applicable noise ordinances.

##### **Permanent Mitigation Measures**

The requirements for permanent traffic noise abatement are contained in Section 2.12 – Bridge and Structures.

#### **2.8.4.3.3 Streams and Wetlands**

A delineation of the wetlands within the existing drainage facility is shown on the basemap. WSDOT has selected a mitigation site, and is in the process of developing a wetland mitigation plan. The wetland mitigation plan will accommodate unavoidable impacts to 0.05 acres of Waters of the United States (streams, wetlands and jurisdictional roadside ditches), based on a 2:1 mitigation ratio. WSDOT has submitted Permit applications to the Corps of Engineers, Department of Ecology and the City of Everett for this mitigation. These Permits are anticipated to be received no later than February 2005. No Work shall occur at Water Quality Site 1 or within Waters of the United States until all Permits are obtained. The Design-Builder shall design the Project to minimize impacts to wetlands and other waters of the United States and including wetland and stream buffer areas.

The wetland delineations shown in the hardcopy of the Final Wetland/Biology Technical Report (Appendix E4) supercedes all other wetland delineation information provided either electronically or in hardcopy.

WSDOT will develop the mitigation plan, as part of this Project. The Design-Builder shall construct the wetland mitigation site in accordance with the mitigation plans provided by WSDOT. The Design-Builder shall assure that the Standards of Success, as outlined in the Wetland Mitigation Report are met through plant establishment activities (see Section 2.14).

#### **2.8.4.3.4 Threatened and Endangered Species**

##### **Construction Mitigation Measures**

Design-Builder shall perform Work in the vicinity of the Ordinary High Water Mark only during the Work window specified by the Washington Department of Fish and Wildlife.

Design-Builder shall, with respect to any temporary and/or permanent vegetation removal associated with stormwater conveyance installation, culvert replacement, and/or water quality facilities, replace such vegetation at a 1 to 1 ratio, shall monitor the affected area for a minimum of three years, and shall achieve at least 80% survival rate for the replaced vegetation.

Design-Builder shall replace all impacted wetlands at ratios dictated by State and local regulatory standards.

Design-Builder shall, in performing construction activities, adhere to Best Management Practices (BMPs) and a Spill Prevention Control and Countermeasures (SPCC) plan as defined by the Temporary Erosion and Sediment Control (TESC) plan, as approved by the WSDOT.

Prior to clearing or grading, Design-Builder shall clearly mark, by flagging or the use of high-visibility fencing, those areas that are to remain undisturbed. During the construction period, no disturbance beyond the marked clearing limits will be permitted. The flagging/fencing will be maintained by the Design-Builder for the duration of construction.

Design-Builder shall construct erosion and sediment control (ESC) facilities in conjunction with all clearing and grading activities, and in such a manner to ensure that sediment-laden water does not enter streams or adjacent wetlands.

Design-Builder shall, on a daily basis, inspect the ESC facilities and maintained such facilities as necessary to ensure their continued functioning.

Design-Builder shall appropriate erosion control measures in areas where construction will occur adjacent to sloughs or wetlands. These measures may include sediment fencing, hay bales, sand bags, dirt berms, or other means.

Design-Builder shall stabilize any area stripped of vegetation where no further Work is anticipated for a period of seven days during the dry season (May 1 to September 30), or for more than two days during the wet season (October 1 to April 30), using appropriate methods

including covering, mulching, or seeding. Any area to remain unworked for more than 30 days shall be seeded and/or covered.

All vegetation removed from construction areas shall be removed by the Design-Builder from the Site and shall not be placed in wetlands, streams, or their buffers.

Design-Builder shall use silt fences, straw bales, and other sediment filtration devices to minimize the inputs of fine sediment during rainstorms prior to Physical Completion. Silt fence will be used in compliance with western Washington construction BMPs.

Following construction, Design-Builder shall vegetate or otherwise permanently stabilize all disturbed areas. Design-Builder shall at such time also remove any temporary ESC facilities.

### **Permanent Mitigation Measures**

Design-Builder's stormwater design shall meet the March 2004 WSDOT Highway Runoff Manual.

Design-Builder shall design all stormwater water quality facilities for enhanced treatment.

Water quality facilities located within the floodplains shall not include vaults.

The Biological Assessment will require an addenda if there are changes to the impact of the Project as stated within the Biological Assessment. If an Addendum is required, the Design-Builder shall prepare it based upon the changes indicated by the Design-Builder.

The Design-Builder shall implement or construct all mitigation measures required for the Project unless noted otherwise.

### **2.8.4.3.5 Historic, Archaeological and Cultural Preservation**

#### **Construction Mitigation Measures**

It is national and state policy to preserve, for public use, historical and pre-historical objects such as ruins, sites, buildings, artifacts, fossils, or other objects of antiquity that may have significance from a historical or scientific standpoint. No known historic, archaeological or cultural sites have been identified within the I-5 Right of Way as described in the Environmental Assessment. Detailed surveys of proposed Water Quality Sites have not been performed.

The Design-Builder shall retain the services of a professional archaeologist. This Project Archaeologist shall prepare a survey and monitoring plan for performing pre-construction surveys of Water Quality Site 1, 2 and 3 and monitoring of construction activities that penetrate undisturbed, native alluvial soils in Water Quality Site 4 and 5 and the Lowell Hillside Drainage Easements. The monitoring plan must be approved by WSDOT prior to starting the Work.

Any archaeological, historical or cultural objects encountered by the Design-Builder shall not

be further disturbed. The Design-Builder shall immediately notify the Department of any such finds. The Project Archaeologist in consultation and coordination with the Department will determine if the material is to be salvaged. The Design-Builder may be required to stop Work in the vicinity of the discovery until such determination is made. If the Project archaeologist determines that the material is to be salvaged, the Department may require the Design-Builder to stop Work in the vicinity of the discovery until the salvage is accomplished.

### **Permanent Mitigation Measures**

#### **2.8.4.3.6 None**

#### **2.8.4.3.7 Hazardous Waste Sites**

##### **Known Contaminated Sites**

###### ***Water Quality Site 1***

Field exploration and historical data has shown that the area for Water Quality Site # 1 contains hazardous materials, see RFP Appendix E-7 and RFP Appendix E-8. The Work includes remediation of 100% of all excavated material. Design-Builder shall assume that all excavated material is contaminated. Design-Builder shall include price and schedule impacts for this Work in the Proposal. Remediate this excavated material in accordance with applicable state and federal laws and regulations (including the regulations and requirements of the U.S. Environmental Protection Agency (EPA), the Washington Department of Ecology (Ecology), and the Occupational Safety and Health Administration (OSHA)) and the following Sections. Within three (3) weeks of Physical Completion, document the remedial activities with a remediation report to the Department.

The City of Everett has obtained a No Further Action (NFA) finding for remediation at Water Quality Site #1. The Design-Builder shall contact, demonstrate and obtain approval from the Washington State Department of Ecology that the proposed Site design details at Water Quality Site #1 meets applicable requirements prior to beginning any construction Work at Water Quality Site #1.

###### ***Water Quality Site 2***

Field exploration and historical data has shown that the area for Water Quality Site # 2 contains hazardous materials and two buried underground storage tanks. Design-Builder shall assume that all excavated material is contaminated. The Work includes building demolition, remediation of 100% of all excavated material and removal and remediation of two underground storage tanks. Design-Builder shall include price and schedule impacts for this Work in the Proposal. Design-Builder shall remediate the excavated material, dispose of the building hazardous material, and storage tanks in accordance with applicable state and federal laws and regulations (including the regulations and requirements of the U.S. Environmental Protection Agency (EPA), the Washington Department of Ecology (Ecology), and the Occupational Safety and Health Administration (OSHA)) and the following Sections. Within three (3) weeks of Physical Completion, Design-Builder shall document the remedial activities with a remediation report to the Department. Design-Builder shall obtain the necessary permit from the City of Everett to demolish the building.

**Sites Discovered During Construction*****Suspension of Work***

If abnormal conditions are discovered during construction that indicate the presence of a hazardous substance, Design-Builder shall immediately suspend Work in the area and notify the Department. Design-Builder shall develop reporting and remediation plan as described below. Abnormal conditions include the presence of barrels; buried storage tanks; aboveground tanks; obnoxious odors; excessively hot earth; stained or discolored soils; smoke; and unidentifiable powders, sludge, or pellets.

***Remediation Plan and Report.*** Design-Builder shall develop a written remediation Work plan for the Site in accordance with Ecology and EPA regulations and requirements and shall develop an opinion of probable construction costs for the remediation plan. Design-Builder shall obtain approval of the remediation plan from WSDOT and appropriate governmental agencies and shall remediate the hazardous substance in accordance with Governmental rules, regulations, and requirements. Within 14 calendar days of the completion of the remediation, Design-Builder shall document the remedial activities and regulatory approvals with a remediation report to WSDOT.

**2.8.5 Submittals**

Design-Builder shall submit the following information and documentation, at a minimum, to WSDOT and to regulatory agencies as directed by WSDOT and required by the Contract Documents and environmental approvals:

1. Environmental Compliance Plan
2. Environmental Communication Protocol
3. Environmental Construction Monitoring Reports
4. Temporary Erosion and Sediment Control Plan
5. Spill Prevention, Control, and Countermeasures Plan
6. NPDES Baseline General Permit for Construction Sites
7. Noise Abatement Design Report
8. Fugitive Dust Control Plan
9. Air quality analysis where necessary for ramp metering and for changes to previous modeled intersections
10. Archaeological Survey and Monitoring Plan
11. Investigative Work plans, Site investigative reports, and remediation Work plans as necessary for hazardous material discovery and remediation
12. Wetlands delineations and appropriate Section 404 Permit Application for the design or temporary construction impacts as necessary
13. Noise Variance

## **2.9 PUBLIC INFORMATION AND COMMUNITY INVOLVEMENT**

### **2.9.1 Public Information**

#### **2.9.1.1 General**

This major construction Project will affect drivers, passengers, businesses, neighbors and the community. WSDOT seeks to minimize negative effects and foster Project support by achieving the following goals:

- minimize traffic and community impacts; anticipate unavoidable impacts and provide timely, relevant, accurate and reliable information
- increase public awareness and satisfaction with the Project and design-build contracting
- appropriately and actively involve communities in decision making, including decisions related to context sensitive design
- prove public accountability

#### **2.9.1.2 Public Information Staff**

The Design-Builder shall provide, at a minimum, a full-time public information staff person who will be responsible for providing timely and accurate Project information to WSDOT staff and support Project communications at WSDOT's direction. Other Design-Builder staff will be available to help with public information as needed and requested by WSDOT. WSDOT will also provide staff dedicated to public information. The Design-Builder's public information staff member will be expected to work cooperatively with WSDOT public information staff to exceed public information expectations, provide information about construction and traffic impacts in advance, foster public satisfaction with the Project, and provide accurate and candid progress updates.

Design-Builder's public information staff member must have professional experience in all aspects of public information on significant transportation projects, including:

- writing for the news media and public
- taking photographs and video
- providing and presenting information to citizens, news reporters, community groups, and others
- developing, implementing and measuring results of strategic communications plans and strategic messaging
- developing and producing maps, charts, graphs, diagrams, and other visual images and graphics
- developing and implementing public information and community involvement programs

WSDOT staff will review Design-Builder's public information and community involvement staff qualifications and assess whether they have the skills and experience to perform the

public information services required of the Design-Builder. WSDOT reserves the right to request changes if necessary.

### **2.9.1.3 Project Information**

The Design-Builder will write and maintain teamwork, quality and Project information flow plan per WSDOT's standards and coordinate with WSDOT for finalization and implementation. The Design-Builder and public information staff shall meet with WSDOT's Construction Traffic Coordination and public information staff at least two weeks before construction activities begin to review requirements and responsibilities and go over the public information plan.

Design-Builder's public information specialist shall have real-time access to all Project details that may be relevant to drivers, neighbors, public agencies, emergency services, businesses, and other interested groups. The Design-Builder shall provide timely and accurate information about all aspects of the Project to WSDOT public information, traffic, design, construction, and emergency response staff.

The Design-Builder will provide WSDOT with free and unfettered access to Project information and public information materials. Design-Builder is expected to provide information including but not limited to Project updates (schedule, budget, Work completed and planned, safety, traffic, noise, natural environment, etc.), photos, maps, written detour routes, charts, diagrams, detour route maps, Project designs and design element images, ramp closures, channelization plans, video footage, animation and other materials of use to the news media, public and community outreach staff. All such information shall comply with WSDOT's standards and be made available in electronic or print form to WSDOT at any time without additional cost. WSDOT staff will review and approve these materials prior to release or distribution.

The Design-Builder public information specialist is expected to provide construction information to WSDOT on a weekly basis at a minimum, and more frequently if construction and traffic impacts change or if deemed necessary by WSDOT. Design-Builder shall provide weekly updates each Thursday on the following week's planned closures, detours, general Project status and other information relevant to the drivers, the community and to the Construction Traffic Coordination staff to be included in the department's Construction Update Report.

The Design-Builder shall provide information in a manner that provides enough time for WSDOT and others to review and use the information, produce and distribute public information materials, and meet related WSDOT standards. Information provided must meet or exceed WSDOT standards as determined by WSDOT. Design-Builder shall review public information materials for accuracy at WSDOT's request.

The Design-Builder will provide WSDOT staff and news media easy and immediate access to the Project Site at WSDOT's request. The Design-Builder's public information staff shall attend weekly public information, construction traffic staff meetings, and training and

coordination sessions as requested by WSDOT. The Design-Builder's public information staff shall attend daily traffic impact or incident meetings when requested by WSDOT.

#### **2.9.1.4 Photographs and video**

Design-Builder shall document conditions during construction, public outreach, and other Project related topics using photos and video.

- Design-Builder shall install, set-up, operate and maintain 3 time-lapse cameras to document the new Broadway exit overpass and other construction areas as determined by WSDOT. The Design-Builder is responsible for relocating the cameras as required.
- Design-Builder shall provide at least three-dozen photos acceptable to WSDOT monthly with accompanying information and photo releases for Web site, newsletters and other uses.
- Design-Builder shall produce and distribute photos and video as requested.
- Design-Builder shall track and file photos and video using a documentation system acceptable to WSDOT, and shall provide a spokesperson and people for photos as needed by WSDOT
- Design-Builder shall provide or obtain needed accompanying information (use permissions, publication rights etc) for photographs and videos.

#### **2.9.1.5 Open Houses & Public Meetings**

Design-Builder shall hold at least two public open houses per year to inform the public of the Projects status, answer key issues related to the Project.

Design-Builder shall assist with outreach to civic and community groups, including but not limited to the City of Everett, neighborhoods, businesses, truckers, shippers, transit agencies, employee transportation coordinators, Boeing, U.S. Navy, Everett Mall, tribes, Port of Everett, and environmental justice populations. Design-Builder shall be available to attend public and community meetings or make presentations at WSDOT's request. There will be at least 15 meetings per year for the life of the Contract.

Design-Builder shall assist with set-up and break-down for open houses and public meetings, be available to answer questions and present information, compile and publish meeting records and summaries, develop and produce presentation boards and materials and assist with follow-up, including information to respond to open house attendees and collected comment cards.

Design-Builder shall be responsible for the preparation of graphics, handouts, minutes of the meetings, audiovisual displays and similar material meetings and open houses. All such materials shall prominently identify WSDOT and be pre-approved by WSDOT staff. The Design-Builder shall expect to work with the team to finalize the agenda for any public meetings.

Design-Builder shall conduct tours for WSDOT public information staff and targeted outreach groups as needed.

The Design-Builder will contact the top 50 businesses and large employers (companies that employ more than 100 employees) and community groups within ten-mile radius of the Project to provide information on potential traffic disruptions and alternate transportation options.

Upon WSDOT's request, the Design-Builder shall personally visit large employers to give presentations to employees on alternative routes/options. The Design-Builder shall provide staff for attendance at the meetings and will provide handouts, detour maps, graphics, displays and a contact person to answer commuter questions.

#### **2.9.1.6 Media relations**

Although media interviews will mainly be the responsibility of WSDOT, the Design-Builder shall participate in media interviews or other media information support activities at all times at WSDOT's request. When participating in media interviews, the Design-Builder will provide information that complies with WSDOT messaging and other standards, including requirements for advance Project information, Project progress and accountability, and timely response to media inquiries.

The Design-Builder shall inform and coordinate all media contact activity with WSDOT prior to interviews.

The Design-Builder shall conduct media tours of the Project Site at WSDOT's request. The Design-Builder shall provide information and materials that meets local broadcast and print media requirements and deadlines. All information released to news media must be pre-approved by WSDOT.

#### **2.9.1.7 Correspondence and e-mail**

Design-Builder shall provide staff to receive and respond to correspondence from the public, including e-mail, letters and other forms of correspondence from the public. Design-Builder shall identify a contact name, postal address and e-mail address to provide to the public. All correspondence will be answered per WSDOT standards.

Design-Builder shall provide WSDOT a weekly summary of public inquiries, complaints and comments and their responses. These summaries shall note trends and explain how Design-Builder responded to public comments and complaints.

#### **2.9.1.8 Telephone Project Hotline**

Design-Builder shall set-up, maintain and staff a toll-free Project telephone hotline.

Design-Builder shall post the phone number on appropriate motorist signs at the Project Site. WSDOT and the Design-Builder will use the phone number extensively on public documents.

Design-Builder shall set up the phone hotline to provide callers daily updates on current construction and traffic impacts and Project progress. Callers will be provided an option to speak to someone from the Design-Builder staff at all times.

The Design-Builder shall provide timely and accurate information to WSDOT communications staff to update the hotline message daily. Design-Builder shall staff the phone line 24-hours a day and respond to any public inquiries within 12 hours. Design-Builder shall ensure that all Design-Builder staff answering the phone are trained, friendly, responsive, and informed about construction and traffic impacts.

Design-Builder shall compile, record, organize and summarize public questions and comments taken on the phone hotline via electronic file; manage response review; record responses to callers; analyze and report trends; and provide WSDOT with a weekly report via electronic file.

#### **2.9.1.9 Emergency and incident response and during/after hours communications**

Design-Builder shall review, coordinate, train staff, provide a trained spokesperson in emergencies and provide information and assistance promptly as requested by WSDOT during an emergency.

#### **2.9.1.10 Portable highway advisory radio**

Design-Builder shall provide timely and accurate information daily or as requested by WSDOT for highway advisory radio (HAR) messages. Design-Builder shall submit HAR messages to WSDOT for review and approval in advance.

#### **2.9.1.11 Portable variable message signs**

Design-Builder shall purchase, operate and maintain six (6) portable variable message signs (VMS) that are acceptable to WSDOT. Two (2) of the VMS signs shall become the property of WSDOT at the Completion of the Project.

Supply of additional VMS signs reasonably deemed necessary by WSDOT for the Project shall be the responsibility of the Design-Builder.

The Design-Builder shall provide information as needed for VMS messages.

### **2.9.1.12 Citizen's Advisory Committee Support**

The Design-Builder shall attend and participate in all community or citizen's advisory group meetings at the request of WSDOT. Design-Builder shall prepare and provide supporting documents as requested by WSDOT.

### **2.9.1.13 Special Events**

The Design-Builder shall attend, participate and provide safe, accessible and high-profile staging areas for special events set up by WSDOT staff, to include, but not limited to one ground-breaking ceremony at start of construction, one milestone celebration each year during the life of the Contract and a ribbon-cutting ceremony when the lanes open to traffic.

Design-Builder shall prepare and provide supporting documents as requested by WSDOT.

## **2.9.2 Community involvement**

### **2.9.2.1 Philosophy**

Design-Builder shall base designs of all aesthetics and landscaping components, including water quality treatment sites, park enhancements, noise walls, retaining walls and bridge abutments on RFP Section 2.14.

### **2.9.2.2 Working with the City of Everett and Individual Neighborhoods**

Design-Builder shall appropriately and actively involve the City of Everett, City of Everett Parks Department, Everett Office of Neighborhoods, neighborhood committees and other community groups in the design decision-making process, including decisions related to context sensitive design.

Design-Builder shall be responsible for working with and getting final approval on designs from WSDOT (including WSDOT's aesthetics team).

#### **2.9.2.2.1 Presentations, Workshops and Neighborhood Meetings**

Design-Builder shall communicate and meet directly with established neighborhood committees, City of Everett, City of Everett Parks Department, Everett Office of Neighborhoods and other community groups to actively include them in the context sensitive design process and aesthetics and landscaping components final design choice.

- Design-Builder shall organize, conduct and record feedback for two community involvement presentations and workshops with City of Everett and the community (also called design charrettes). Design-Builder shall work with the City of Everett and WSDOT to plan these workshops.
- The Design-Builder shall attend, present, take community feedback and report back at two meetings each for seven individual neighborhoods during the design process (total of 14 meetings) and one update meeting each year at established neighborhood meetings for the life of the Contract (total of 21 meetings). Design-Builder shall be

responsible for working with, gathering feedback, gaining approval from and continually updating the Delta, Riverside, Lowell, Pinehurst, Glacier View, Valley View/Sylvan Crest and Cascade View neighborhoods in the City of Everett on noise walls and landscaping facing neighborhoods. Design-Builder shall coordinate with the neighborhood chair and Office of Neighborhoods to book meeting place, time and date for each neighborhood/community involvement meeting by contacting the current neighborhood chair and Everett Office of Neighborhoods via information found on the City of Everett Web site at: <http://www.everettwa.org/> or by phone at 425.257.8717 to set up meetings.

- Design-Builder shall set-up and break down meetings, provide handouts, presentation boards and materials.
- Design-Builder shall consider the recommendations of the community in the final design of the Project.

#### **2.9.2.2.2 Collateral Materials and Information for Community Involvement**

Design-Builder shall research, draft, design, produce and send out flyers advertising the community involvement meetings per WSDOT communications and printing standards. Design-Builder shall get all flyers in a format acceptable to WSDOT prior to release or distribution. Design-Builder shall also send final flyer to the Everett Office of Neighborhoods for distribution. All meeting presentation materials and handouts need to be in a format acceptable to WSDOT. Design-Builder shall give WSDOT ample time to review and Design-Builder to make changes.

#### **2.9.2.2.3 Community Involvement Group Review**

Design-Builder shall form a community involvement advisory group with City of Everett Parks, Planning and Public Works, Everett Office of Neighborhoods and WSDOT to identify, propose, and evaluate landscape and aesthetic improvements throughout the Project.

Design-Builder shall facilitate the subcommittee meetings and assist the subcommittee(s) in developing a program that meets the requirements of WSDOT, Project budget, City of Everett, Everett Parks Department, Everett Office of Neighborhoods, neighborhoods and the community.

#### **2.9.2.2.4 Coordinating with WSDOT and meeting standards**

The Design-Builder shall assure WSDOT community involvement standards while conducting community outreach and finalization of plans.

The Design-Builder shall coordinate all community outreach efforts with WSDOT's communications manager and public information, design and construction staff.

## **2.10 UTILITIES AND THIRD PARTY AGREEMENTS**

### **2.10.1 General**

The Design-Builder will be responsible for the coordination and resolution of all Utility Relocation issues relating to the Project, as set forth in the Contract Documents.

Construction of the Project will affect both existing and planned Utilities (including their associated appurtenances). The Design-Builder's services shall include the following, except as otherwise provided in Section 1-07.17 or in this Section 2.10:

- a) Identification and verification of all Utilities located within or near the Project's Right of Way or otherwise impacted by the Project;
- b) Identification of any Utility easements or other rights or interests in real property inside or outside the Project's Right of Way that may require quitclaim or other release;
- c) Notifications to Utility Owners with respect to Relocation of their Utilities;
- d) Drafting and negotiation of Relocation Agreements with Utility Owners;
- e) Coordination of design and construction efforts for all Relocations;
- f) Development of design for those Relocations for which such responsibility is assigned to the Design-Builder pursuant to Section 1-07.17(3);
- g) Construction of Relocations, for those Relocations for which such responsibility is assigned to the Design-Builder pursuant to Section 1-07.17(3);
- h) Reimbursement of Utility Owners' Relocation Costs, for Category #2 Utilities only;
- i) Verification that each Relocated Utility, as designed and constructed, is compatible with and interfaces properly with the Project;
- j) All Incidental Utility Work; and
- k) Confirmation that all appropriate Governmental Approvals have been obtained by or on behalf of each person that is performing Relocation construction work, obtaining and paying the cost of such Governmental Approvals where required pursuant to Section 2.10.1.4 and verification that all construction work (whether performed by or on behalf of the Design-Builder or any Utility Owner) complies with the requirements of the applicable Government Approvals.

#### **2.10.1.1 VACANT**

#### **2.10.1.2 Reimbursement of And Collection from Utility Owners**

##### ***Reimbursement of Utility Owners***

As provided in Section 1-07.17(3).2, for any Utilities covered by a Utility MOU included in the RFP Appendix U1, Cost Responsibility is in accordance with the applicable Utility MOU. For any other Utilities, Cost Responsibility shall be considered a Category 1 as provided in 1-07.17(3).2. The Design-Builder shall reimburse Utility Owners for their Relocation Costs for Category #2 Utilities as well as making any other reimbursements to Utility Owners required pursuant to Section 1-07.17(4).3. The Relocation Agreements shall provide that the eligibility of Utility Owners' Relocation Costs for reimbursement shall be consistent with the requirements of 23 CFR Part 645A and the then-current version of WSDOT's Utilities Manual.

If the Design-Builder fails to make any payment to a Utility Owner required pursuant to Section 1-07.17(4).3 or elsewhere in the Contract Documents on or before the deadline stated in the applicable Relocation Agreement (or if no deadline is stated, within thirty (30) days

after receipt of the Utility Owner's invoice therefor), then WSDOT shall have the right to pay the Utility Owner the amount due (including any interest and/or penalties). If WSDOT makes any payment pursuant to this Section 2.10.1.2, the Design-Builder shall reimburse WSDOT for such payment within ten (10) calendar days after receipt of WSDOT's invoice therefor, or, in WSDOT's discretion, WSDOT may deduct the amount of reimbursement due from the payment (or payments, if necessary) next due to the Design-Builder under the Contract. The Design-Builder shall promptly deliver to WSDOT copies of all invoices received from Utility Owners as described in this Section 2.10.1.2.

#### ***Collection from Utility Owners***

The Relocation Agreements shall provide that eligibility of the Design-Builder's Relocation Costs for reimbursement shall be consistent with an the applicable franchise or permit and the applicable Governmental Rules.

### **2.10.1.3 Maintenance and Care During Construction**

The Design-Builder shall carry out all Work impacting Utilities carefully and skillfully and shall support, secure, and exercise care with respect to Utilities so as to avoid damage to them. The Design-Builder shall ensure continuity of all existing utility services to all users except when that Utility Owner determines that temporary interruption is necessary and acceptable. The Design-Builder shall not move or remove any Utility without the written consent of the Utility Owner, unless otherwise directed by WSDOT. All costs required to protect Utilities during the course of the Work shall be the Design-Builder's responsibility.

The Design-Builder shall comply with all applicable Governmental Rules relating to grading or excavation in the area of underground Utilities. Before starting construction that may affect any Utilities in a particular area (whether underground or overhead), the Design-Builder shall notify the affected Utility Owners in writing at least thirty (30) days prior to the start of the Work. It is the responsibility of the Design-Builder to contact the Utility One-Call Locate Center at 1-800-424-5555 prior to performing any excavations. The Design-Builder is responsible for maintaining all appropriate clearances from active power-lines per WAC 296-155-428.

If any Utilities are damaged by Design-Builder activities, the Design-Builder shall immediately notify the affected Utility Owner, the One-Call Locate Center, and WSDOT. The Design-Builder shall bear all costs associated with damage caused by the Design-Builder, including Utility downtime, all reconstruction, all remediation of hazards, litigation, loss of product, Utility start up, and delay costs. At the Utility Owner's request, the Design-Builder shall repair the damage; or the Utility Owner may choose to repair the damage itself at the Design-Builder's expense. All repairs by the Design-Builder shall be performed to the reasonable satisfaction of the Utility Owner. The Design-Builder shall pay any reimbursement due pursuant to this paragraph within 30 days after receipt of the Utility Owner's invoice therefore, unless otherwise provided in an applicable Relocation Agreement.

#### **2.10.1.4 Governmental Approvals and Other Permits**

The Design-Builder shall obtain or ensure that the Utility Owner obtains all Governmental Approvals and other clearances, permits, approvals and agreements necessary for the Relocations, and shall verify that the same have been obtained prior to commencing or permitting the commencement of any construction affected thereby. The Design-Builder

shall verify that the work performed (whether by the Design-Builder or by or on behalf of the Utility Owner) complies with the requirements of such Governmental Approvals and other clearances, permits, approvals and agreements.

## **2.10.2 Utility Agreements, Franchises and Permits**

### **2.10.2.1 Memoranda of Understanding**

Any Utility MOU's entered into between WSDOT and Utility Owners or sent to the Utility Owners by WSDOT prior to 14 calendar days before the Proposal Date are included as Reference Documents in RFP Appendix U1. Utility MOUs provided in RFP Appendix U1 shall be considered accepted regardless of whether or not signed by either WSDOT or the Utility Owner. It is anticipated that WSDOT may subsequently enter into additional Utility MOU's, although WSDOT has no obligation to do so. Such additional Utility MOU's, if any, shall be based on the same standard format (for Category #1 and Category #2 Utilities, respectively) used for the Utility MOUs contained in RFP Appendix U1. They will include such modifications as result from WSDOT's negotiations with such Utility Owners, in WSDOT's sole discretion. WSDOT shall provide to the Design-Builder a copy of any additional Utility MOUs after the date of issuance of the Notice to Proceed.

The Design-Builder acknowledges that as more particularly provided in Section 1-07.17(2).1, the Utility MOU's are not binding on or enforceable against the Utility Owners (nor are they binding on or enforceable against WSDOT). Nevertheless, unless otherwise directed by WSDOT or modified by an executed Relocation Agreement, the Design-Builder shall comply with all Utility MOU's that are included in RFP Appendix U1.

Refer to Section 1-07.17(10).1 for provisions dealing with changes in Cost Responsibility. Refer to Section 1-07.17(11) for the circumstances under which the Design-Builder may be entitled to a Contract Time extension if a Utility Owner fails to satisfy a time commitment made in its Utility MOU with respect to a Category #2 Utility. The Design-Builder is advised that except as described in this paragraph, pursuant to Section 1-07.17 the Design-Builder will not be entitled to any Contract Time extension or Contract Price increase if a Utility Owner fails to meet any commitments made in its Utility MOU with respect to either a Category #1 or a Category #2 Utility.

### **2.10.2.2 Assignment/ Delegation of Utility Permits /Franchise Rights and Obligations**

For each Franchise/Permit Utility that the Design-Builder determines will require Relocation in order to accommodate the Project, the Design-Builder shall prepare an "Assignment/Delegation of Utility Permit/Franchise Rights and Obligations" document in the form of RFP Appendix F3. The Design-Builder shall submit the completed document to WSDOT for approval and execution. The Design-Builder may begin working with the identified Utility Owner prior to execution of the Assignment/Delegation document by WSDOT; provided, however, that such a document shall be submitted to WSDOT for each Franchise/Permit Utility not later than the Design-Builder's submittal to WSDOT of the first draft of a Relocation Agreement for such Utility, in accordance with Section 2.10.2.3 below.

If the Design-Builder determines that it will be unable to successfully negotiate a reasonable Relocation Agreement with the Utility Owner for a particular Franchise/Permit Utility, the Design-Builder shall notify the Utility Owner and WSDOT of such determination and may,

in addition to requesting assistance from WSDOT as provided in Section 1-07.17(7), exercise the rights that have been assigned to it pursuant to the applicable Assignment/Delegation document; provided, however, that WSDOT makes no representation or warranty as to the Design-Builder's ability under the Assignment/Delegation document to enforce those rights in a manner that satisfies the Design-Builder's Project requirements, or at all.

### **2.10.2.3 Relocation Agreements**

#### ***Requirements***

As required by Section 1-07.17(2).2, each Relocation (other than Protections in Place) shall be addressed in a Relocation Agreement entered into between the Design-Builder and the Utility Owner. The Design-Builder shall prepare and negotiate each Relocation Agreement (including such exhibits as may be appropriate), and shall prepare and provide all Project information (e.g., reports, plans and surveys) as necessary to negotiate the Relocation Agreement. For each Relocation, the Design-Builder shall initiate contact with the Utility Owner at the earliest possible time in order to begin working with the Utility Owner to develop a Relocation Agreement and a Relocation plan that meet the Project design and schedule.

The Design-Builder shall refer to Chapter 2 of the WSDOT Utilities Manual for guidance in preparing the Relocation Agreements. Each Relocation Agreement will set forth the specific details of the Relocation(s) that it addresses, including the agreed ultimate nature and location of relocated facilities, allocation of responsibility for design, construction and other Relocation tasks, applicable standards, Cost Responsibility, cost estimates and eligibility of costs for reimbursement if applicable, reimbursement procedures where appropriate, schedules, joint use issue resolution, procedures for design review and approval as well as inspection of construction, acceptance of the Relocation Work, and such other provisions as may be appropriate or reasonably required by WSDOT. The Design-Builder acknowledges that because the Utility MOU's are nonbinding, the Design-Builder may find it necessary to re-negotiate with the Utility Owners provisions (such as time commitments) that were included in the Utility MOU's; as a result, the terms of a Relocation Agreement may differ from those in the related Utility MOU. Notwithstanding the foregoing, Cost Responsibility for each Relocation shall be as determined pursuant to Section 1-07.17(3).2 unless otherwise specified by WSDOT in accordance with Section 1-07.17(10).1. Each Relocation Agreement shall designate WSDOT as a third-party beneficiary thereof. Schedules for completion of the tasks specified in each Relocation Agreement shall conform to the Contract Schedule, which shall provide reasonable and adequate time for each such task.

As required pursuant to Section 1-07.17(2).2, the Design-Builder shall provide to WSDOT the opportunity to participate in negotiations of Relocation Agreements. Accordingly, the Design-Builder shall give WSDOT at least five calendar days advance notice of negotiation sessions. The Design-Builder shall keep WSDOT apprised of the status of negotiations by submitting to WSDOT draft minutes of each negotiation session within two business days thereafter, and final minutes incorporating any WSDOT comments within two calendar days after WSDOT's approval or comments, as applicable. Once a Relocation Agreement has been fully executed, no material modifications to the work covered thereby or to the terms thereof shall be made without processing a revised Relocation Agreement (in accordance with the procedures set forth in this Section 2.10.2.3).

***Process for WSDOT Review***

The Design-Builder shall submit each draft of each Relocation Agreement (including any draft exhibits) to WSDOT for its review and comment and shall incorporate all of WSDOT's comments therein prior to submitting the draft Relocation Agreement to the Utility Owner. Once a draft Relocation Agreement has been reviewed by WSDOT, no additional modifications (including exhibits) shall be reflected on any drafts thereof submitted to the Utility Owner (except for modifications made to incorporate WSDOT's comments), without first resubmitting the draft to WSDOT for further review. The Design-Builder shall deliver to WSDOT a copy of each such draft submitted to a Utility Owner concurrently with its delivery to the Utility Owner.

WSDOT shall review each draft Relocation Agreement submitted to it and deliver its comments thereon to the Design-Builder within 7 calendar days after WSDOT's receipt of such draft. WSDOT's failure to timely respond to a draft Relocation Agreement submittal does not constitute an approval of the terms or form thereof. Each final Relocation Agreement shall be submitted to WSDOT for review at least 14 calendar days prior to the date scheduled for its full execution. A Relocation Agreement shall be considered final and ready for execution when all of its provisions have been reviewed by WSDOT through the review process described above. With each draft Relocation Agreement submitted to WSDOT, the Design-Builder shall include its most current Design Documents identifying the proposed Relocation(s) affected thereby.

**2.10.2.4 New Franchises and Permits**

Simultaneously with preparation of the Relocation Agreement for each Franchise/Permit Utility, the Utility Owner shall prepare a corresponding application for a new or amended franchise or permit. The Design-Builder shall ensure that the Utility Owner submits such application to WSDOT as far in advance of the commencement of the Relocation construction as possible, but in any event not later than 30 calendar days prior to commencement of such construction. The application shall be modified together with the draft Relocation Agreement as needed to obtain WSDOT approval. Prior to commencement of construction (by either the Design-Builder or the Utility Owner) of a new or relocated Utility facility within Right of Way owned or controlled by WSDOT, the Design-Builder shall ensure that a new or amended permit or franchise has been issued by WSDOT; a new or amended permit or franchise is not required for the abandonment or removal of an existing Utility from within such Right of Way. A list of existing Franchise/Permit Utilities (by milepost) is provided in RFP Appendix U.

**2.10.3 Identification of Utilities****2.10.3.1 WSDOT-Supplied Information**

As more particularly provided in Section 1-07.17(5), WSDOT has performed (or caused its consultants to perform) certain investigations of existing Utilities located within the Project's Right of Way; such investigations were preliminary and their results may be inaccurate and/or incomplete. The Utility Information is provided in RFP Appendix S (which provides the results of a limited Subsurface Utility Engineering (SUE) investigation), RFP Appendices U, U1, U2, U3, and U4, and elsewhere in the RFP documents. The Design-Builder is advised that:

1. WSDOT's investigations may have included: (a) requesting “as-builts” from Utility Owners listed in the WSDOT database as having Franchise/Permit Utilities located within the Project's Right of Way, and (b) visually locating above-ground Utility objects and visible manhole, valve box, vault, etc. covers and surveying above ground objects.
2. WSDOT has not identified any Service Lines for this Project.
3. The Existing Utility Ownership Plans in RFP Appendix U2 may be used to identify Utility ownership only (although they may not be accurate in all cases) and shall not be utilized for determining Utility location.

Refer to Section 1-07.17(9) for the limited circumstances in which the Design-Builder may be entitled to an extension of the Contract Time or an increase in the Contract Price on account of delays and/or increased costs of the Work that are directly attributable to the correction of inaccurate Utility Information. Except as provided in Section 1-07.17(9), the Design-Builder's reliance on any Utility Information is at the Design-Builder's sole risk.

### **2.10.3.2 The Design-Builder's Investigations**

The Design-Builder shall be solely responsible for verifying, at its own expense, the exact location (horizontal and vertical), size, type, and all other relevant characteristics of all Utilities (including Service Lines) located within the Project's Right of Way or otherwise potentially impacted by the Project (including any located on private property), whether or not such Utilities are shown in the Utility Information. Such actions shall include making diligent inquiry at the offices of the Utility Owners, consulting public records, and conducting field studies (such as potholing), as appropriate, taking into consideration the possibility that that Utility Information may be inaccurate and that Utility Owners may provide inaccurate information to the Design-Builder with regard to their facilities. The Design -Builder shall not commence (or permit the commencement of) any construction at any location until such investigations have been completed for that location.

If the Design-Builder's investigations identify any unidentified Utilities or Utilities not identified with Reasonable Accuracy, the Design-Builder shall notify WSDOT and the Utility Owner within 2 calendar days after discovery.

### **2.10.3.3 Utility Reports**

The Design-Builder shall periodically (but not less frequently than monthly, unless otherwise directed by WSDOT) deliver to WSDOT a Utility Report in tabular form, in both electronic and hard copy formats, which shall list each existing or proposed Utility located within the Project's Right of Way or otherwise potentially impacted by the Project, together with at least the following information for each listed Utility:

1. The name of the Utility Owner;
2. A brief description of the Utility by size and type;
3. The location of the Utility;
4. The Proposed Disposition for the Utility;
5. The determination as to whether the Utility is a Category #1 Utility or a Category #2 Utility, based on information provided by WSDOT;

6. The nature of the Utility Owner's right of occupancy of the right of way for such Utility (e.g., franchise, permit, easement), based upon information provided by WSDOT;
7. The status of the applicable Relocation Agreement;
8. Scheduled start and completion dates for design and construction, and the actual status of same; and
9. Such additional information as WSDOT shall reasonably request.

The Utility Report shall be maintained current at all times without regard to the submittal schedule described above. The first Utility Report submitted to WSDOT shall identify all changes from the Utility Information (including deletions). Each subsequent version of the Utility Report submitted to WSDOT shall identify all changes (including deletions) from the previously submitted version.

## **2.10.4 Mandatory Standards and Reference Documents**

### **2.10.4.1 Mandatory Standards**

#### ***General***

All Relocation Work (whether performed by the Design-Builder or by the Utility Owner) shall comply with all applicable Governmental Rules and any applicable permits or franchises, in addition to the Mandatory Standards described in this Section 2.10.4.1. In addition, the Design-Builder's performance of the Utility Work shall comply with all applicable requirements of the Contract Documents.

#### ***Conflicts and Priority***

If there is any conflict between or among any of the standards referenced in this Section 2.10.4.1 (all of which shall be considered "Mandatory Standards"), the most stringent standard shall prevail.

#### ***Ambiguity***

If there is any unresolved ambiguity in Mandatory Standards, the Design-Builder shall obtain clarification from WSDOT before proceeding with design or construction.

#### ***Version and Date***

For any Mandatory Standards issued by WSDOT, the Design-Builder shall use the most current version in effect as of the initial publication date of the RFP unless modified by Addendum or Change Order. For any Mandatory Standards that are Utility Standards issued by a Utility Owner, the Design-Builder shall use the version of the Utility Standards required by the Relocation Agreement.

With regards to Utility Standards, the Design-Builder is responsible to obtain all Mandatory Standards from the Utility Owners and from any other entities that affect the Utility facilities that are to be Relocated.

**Table 2.10.1**  
**Mandatory Standards for Utilities**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short
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					Forms
1	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project **</i>	N/A		Proposal
2	Utility Owner	<i>Utility Standards (applicable to the particular Utility Owner)</i>			
** Only to the extent the Proposal requirements exceed the requirements of all other Mandatory Standards.					

#### 2.10.4.2 Reference Documents

The Design-Builder may use the Reference Documents listed in Table 2.10.2 as supplementary guidelines for the design and construction of the roadway. These Reference Documents are not listed in any order, as they have no established order of precedence.

**Table 2.10.2**  
**Reference Documents Utilities**

Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	<i>Agreements Manual</i>	M 22-99		
WSDOT	<i>Utilities Manual</i>	M 22-87		
WSDOT	<i>Utilities Accommodation Policy</i>	M 22-86		

#### 2.10.5 Coordination, Meetings and Correspondence

##### 2.10.5.1 Coordination Responsibilities

The Design-Builder shall be responsible for all coordination with each affected Utility Owner that is necessary to accomplish the Relocation Work. Such responsibilities shall include, as appropriate to the specific Utility Owner, obtaining information from and providing information to Utility Owners, keeping WSDOT informed as to the progress of Utility matters on a continuous basis, coordination and scheduling of design review, inspections, approvals and acceptances, and coordination and scheduling of construction work. The Design-Builder is responsible for monitoring the progress of work by Utility Owners and for resolving any scheduling difficulties with the Utility Owners.

The Design-Builder shall keep Utility Owners well informed of the Design-Builder's construction schedules and of changes, which affect their Utilities, as well as giving Utility Owners sufficient time to notify their customers of any potential impacts to service.

The Design-Builder shall cooperate with Utility Owners to the extent that such cooperation is consistent with the Design-Builder's obligations pursuant to the Contract Documents and the scope of the Work. The Design-Builder shall act diligently in maintaining a positive relationship with the Utility Owners.

##### 2.10.5.1.1 Coordination with BNSF Railway Co.

Utilities that have been identified within the Project area on BNSF Railway Co. property include: Allstream, Inc., City of Everett, Puget Sound Energy, Snohomish County P.U.D., Sprint, Telus, and Verizon (Refer to RFP Appendix U1 for identified locations). The Design-Builder shall be responsible for identifying any previously unidentified Utilities on BNSF Railway property, which may be in conflict with the Project. The Design-Builder shall coordinate with and include the BNSF Railway Co. in all decisions regarding Utility

Relocations on BNSF Railway Co. property. The Design-Builder shall meet the requirements of RFP Section 2.21 – Relations with Railroad.

#### **2.10.5.2 Notices**

All notices to Utility Owners shall be given in writing unless otherwise specified in the Contract Documents.

#### **2.10.5.3 Meetings with Utility Owners**

The Design-Builder shall implement a schedule of periodic meetings with each Utility Owner, for coordination purposes. Such meetings shall commence as early as possible in the Project design process and shall continue until Completion of the Project (or of the Utility Owner's Relocations, if earlier). Such meetings shall include a preliminary design meeting for the Design-Builder and Utility Owners to meet and familiarize themselves with design elements, Utility facilities, and general features of the Project. Thereafter, the frequency of meetings between the Design-Builder and each Utility Owner shall be appropriate to the matters under discussion. It is anticipated that subsequent meetings shall include (i) design concept meetings to discuss potential Utility impacts and suggestions for cooperative solutions pending more detailed design, (ii) intermediate design meetings to track the progress of ongoing design processes and any necessary right-of-way acquisition, and (iii) final design and initial construction coordination meeting to finalize the plans, specifications, and estimates for Relocation of the Utilities impacted by the Project. After the Relocation plans and specifications are finalized, additional meetings are anticipated to coordinate the construction of the Relocations and to establish a forum for the regular exchange of information during construction to minimize delays and provide for proper inspection. The Design-Builder shall notify WSDOT at least 4 calendar days in advance of each meeting to be held pursuant to this Section 2.10.5.3, and shall allow WSDOT the opportunity to participate in each meeting.

#### **2.10.5.4 Meetings between WSDOT and the Design-Builder**

WSDOT representatives and Design-Builder representatives shall be available to meet at the request of the other party as necessary to discuss and resolve matters relating to the Relocation Work. The Design-Builder shall schedule such meetings at the reasonable convenience of WSDOT's representatives and shall provide WSDOT with a minimum of 4 calendar days prior notice of such meetings.

#### **2.10.5.5 Correspondence Between the Design-Builder and Utility Owners**

The Design-Builder shall deliver to WSDOT copies of all correspondence between the Design-Builder and any Utility Owner within 4 calendar days of receipt or sending, as applicable.

#### **2.10.5.6 Meeting Minutes**

The Design-Builder shall record and maintain objective minutes of all meetings with Utility Owners and/or WSDOT with respect to Relocations. The Design-Builder shall deliver copies of these meeting minutes to the Utility Owner and WSDOT within 4 calendar days after each meeting.

### **2.10.5.7 Scheduling**

In developing the Contract Schedule, the Design-Builder shall schedule the Utility Work, as well as the Relocation Work to be performed by the Utility Owners, in such a manner as to allow sufficient time for completion of all such work in conformity with the Contract Schedule. In performing such scheduling, the Design-Builder shall take into account anticipated time frames for procuring materials and for the Design-Builder's performance of the Utility Work, anticipated review and response times for WSDOT, and review, response and action time frames for the Utility Owners as well as seasonal restrictions on interruptions of Utility service to customers, as provided in the applicable Utility Agreements or as otherwise provided to the Design-Builder by the Utility Owners.

The Design-Builder is responsible for causing the Relocation Work to be completed in a timely manner in order to permit construction of the Project in accordance with the Contract Schedule. The Design-Builder shall minimize adverse effects on the Contract Schedule as a result of any delays in Relocation schedules and changes in field conditions, through the use of shoo-flies or other “work-around” methodology.

Refer to Section 1-07.17(11) for the limited circumstances in which the Design-Builder may be entitled to a Contract Time extension relating to Relocation Work on account of Critical Path delays caused by Utility Owners.

### **2.10.5.8 Contact Information**

All Utility Owners that have been identified as having Utilities impacted by the Project are listed in Section 2.10.11. The information provided for those Utility Owners in Section 2.10.11 includes contact person names, phone numbers and mailing addresses. The contact information was current as of the date of issuance of Addendum #9 to the RFP; the contact information may change subsequent to that date. The Design-Builder shall be responsible for maintaining current contacts with all of the Utility Owners having Utilities impacted by the Project, whether or not such Utility Owners are listed in Section 2.10.11.

## **2.10.6 Performance Requirements**

### **2.10.6.1 Access to Existing Utilities**

Any authorized agent of WSDOT or a Utility Owner may enter the Project's Right of Way to repair, rearrange, alter, or connect their facilities and equipment. The Design-Builder shall cooperate with such efforts and shall avoid creating delays or hindrances to those doing such work. If a Utility Owner's agent needs (or requests) to be on Site to protect its facilities, the Design-Builder will give at least four calendar days advance notice to the Utility Owner of the need to be on Site.

### **2.10.6.2 Best Management Practices and Temporary Erosion and Sedimentation Control**

Regardless of who performs or pays for any proposed Relocation Work, the Design-Builder shall take all steps necessary to ensure that appropriate Best Management Practices (BMP's) and Temporary Erosion and Sedimentation Control (TESC) are followed wherever applicable. Any fines levied against the State for failure to comply with these requirements shall be the sole responsibility of the Design-Builder.

## **2.10.7 Design and Construction**

### **2.10.7.1 Design Requirements**

#### ***General Design Criteria***

The Design-Builder shall be responsible for verifying that all design plans for Relocation Work, whether furnished by the Design-Builder or by the Utility Owner, are consistent and compatible with:

- a. The requirements described in 2.10.4.1;
- b. The requirements of the applicable Relocation Agreements;
- c. The Design-Builder's design and construction of the Project;
- d. Any other Utilities being installed in the same vicinity; and
- e. The terms and conditions of all applicable new and/or amended permits and franchises.

The Design-Builder shall confirm that all Relocations to be installed within a Limited Access Right of Way conform to WSDOT requirements for same.

#### ***Relocation Design Furnished by the Design-Builder***

Where the Design-Builder and the Utility Owner have agreed that the Design-Builder will furnish the design of a Relocation, the Design-Builder shall submit its designs to the Utility Owner for its review and approval. The Design-Builder is advised that Category #2 Utility Owners are generally entitled to reimbursement of their design review costs as Relocation Costs. The Design-Builder shall also submit each Relocation design to WSDOT for its review and comment. The Design-Builder shall coordinate any necessary modification and re-submittals with the Utility Owner and WSDOT. The Design-Builder shall obtain the Utility Owner's written approval for each Relocation design prior to commencing construction of the Relocation. All subsequent changes to designs shall be subject to WSDOT review and comment, and require written Utility Owner approval.

#### ***Relocation Design Furnished by the Utility Owner***

The Design-Builder shall coordinate the delivery of each Relocation design to be furnished by the Utility Owner pursuant to the applicable Relocation Agreement. The Design-Builder shall review each such design for compliance with the applicable requirements of this Section 2.10 and shall provide comments to the Utility Owner as appropriate. The Design-Builder shall submit each Utility Owner's Relocation designs to WSDOT for its review and comments. The Design-Builder shall transmit any WSDOT comments to the Utility Owner, and shall coordinate any necessary modification and re-submittal with the Utility Owner.

### **2.10.7.2 Construction Requirements**

#### ***General Construction Criteria***

The Design-Builder shall be responsible for verifying that all construction Relocation Work, whether performed by the Design-Builder or by the Utility Owner, complies with:

- a. The requirements described in Section 2.10.4.1;
- b. The requirements of the applicable Relocation Agreements;

- c. The approved plans for such construction;
- d. The Design-Builder's design and construction of the Project;
- e. Any other Utilities being installed in the same vicinity; and
- f. The terms and conditions of all applicable new and/or amended permits and franchises.

The Design-Builder shall cooperate with Utility Owner in obtaining necessary permits; and will assure that Utility Owners meet all Project safety and environmental requirements.

### ***Special Qualifications***

For those Relocations for which the Design-Builder is assigned responsibility for construction pursuant to Section 1-07.17(3).1 and for which special qualifications are required by the Utility Owner to perform such construction, the Design-Builder shall utilize (or cause its subcontractors to utilize) qualified personnel acceptable to the Utility Owner to perform such Relocation Work.

### ***Inspection***

The Design-Builder and the Design-Builder's QA Manager shall perform inspection, sampling, and testing of the Utility Owners' and the Design-Builder's Relocation Work, to comply with its obligations under the Contract Documents and Relocation Agreements and in accordance with the approved Quality Management Plan. The Design-Builder shall perform inspection and testing of backfill of all Utility trenches for density and material quality for all Relocation Work within the Project limits. The Design-Builder shall immediately notify WSDOT and the Utility Owner regarding any noncompliance.

Each Utility Owner shall have the right to inspect the construction performed on its Utilities by the Design-Builder. The Design-Builder shall not unreasonably refuse such inspection requests and shall coordinate the schedule and scope of such inspections with the Utility Owner. Any deficiencies determined in the field shall be reported to the Design-Builder's QA Manager for resolution. The Design-Builder shall inform the Utility Owner in writing, prior to commencing any work, that the Utility Owner may report such deficiencies to the Design-Builder's QA Manager for resolution.

The Design-Builder shall obtain the Utility Owner's written acceptance of each Utility for which the Design-Builder performs the construction Relocation Work, promptly upon completion of such work. The Design-Builder shall provide WSDOT with the original copy of each written acceptance.

### **2.10.7.3 Abandonment and Removal**

This Section addresses those existing Utilities which are permanently out of service prior to issuance of the Notice to Proceed or are taken out of service after issuance of the Notice to Proceed (whether or not being reinstalled in a new location), and which the Design-Builder proposes be abandoned in place permanently or removed. Abandonment shall mean the work (e.g. flushing, capping, grouting, etc.) required pursuant to proper Utility Owner procedures and/or applicable Governmental Rules (whichever is more stringent), necessary to be performed with respect to each such Utility that is not removed.

Provided that abandonment is both feasible and permitted by applicable Governmental Rules, the Design-Builder shall make all arrangements and perform all work necessary for each proposed abandonment including design, construction and in each instance obtaining consent from the affected Utility Owners and any affected landowner(s) as well as any necessary Governmental Approvals (or the Design-Builder shall confirm that the Utility Owner has performed the same).

For each such Utility, which cannot be abandoned pursuant to the preceding paragraph, the Design-Builder shall be responsible for all work associated with the removal and disposal of the Utility (or shall confirm that the Utility Owner has performed the same).

The Design-Builder is advised that certain Utilities may be composed of asbestos-coated pipe. The Design-Builder shall design the Project so as to avoid impacting asbestos-coated pipe where feasible, and shall take all other appropriate action to minimize conflicts with such Utility facilities. Any removal of such pipe shall be performed in compliance with all applicable Environmental Laws.

The Design-Builder shall notify the WSDOT Northwest Region Utility Engineer of any Utilities which are determined to be abandoned or removed.

All costs incurred by either the Design-Builder or a Utility Owner pursuant to this Section 2.10.7.3 shall be considered Relocation Costs.

#### **2.10.7.4 Protection in Place**

The Design-Builder shall be responsible for Protecting in Place (or causing to be Protected in Place by the Utility Owner) all Utilities impacted by the Project (including any Utilities remaining in place and any Utilities newly reinstalled as part of the Relocation Work), as necessary to ensure their continued safe operation and structural integrity and in accordance with the requirements described in this Section 2.10. WSDOT's prior written approval shall be required for any Utilities proposed to remain in their existing location

Protection in Place may be permanent or temporary, depending upon the types of measures that are necessary to satisfy the requirements of this Section 2.10.7.4 for a particular Utility.

##### **2.10.7.4.1 Utilities that Shall Not Be Relocated**

The Design-Builder shall design the Project so that the following utilities do not require relocation. Refer to RFP Appendix U4 for available plans/profiles.

1. Underground water line crossing (51" main) at LL STA 516+10. Existing Utility Ownership Plans, Utility Note No. 11, Sheet UT11.
2. Underground sanitary sewer line crossing (30" main) at 52<sup>nd</sup> Ave/Lowell Rd. Potential conflict with the widening on Bridges 5/626 E&W. Existing Utility Ownership Plans, Utility Note No. 17, Sheet UT12.
3. Underground water line crossing (24" main/36" casing & 24" main/42" concrete casing) at LL STA 530+50. Existing Utility Ownership Plans, Utility Note Nos. 19 & 21, Sheet UT12. Test Holes TH 8 & TH 12, RFP Appendix S, Subsurface Utility Information.
4. Underground sanitary sewer line crossing (30") at LL STA 610+30. Existing Utility Ownership Plans, Utility Note No. 17, Sheet UT18.

5. Underground sanitary sewer line crossing (60") at LL STA 610+60. Existing Utility Ownership Plans, Utility Note No. 31, Sheet UT18.
6. Underground sanitary sewer line (42") from LL STA 609+50 to LL STA 614+00. Existing Utility Ownership Plans, Utility Note No. 30, Sheet UT18.
7. Underground sanitary sewer line (42") from LL STA 616+00 to LL STA 617+50. Existing Utility Ownership Plans, Utility Note No. 30, Sheet UT18.
8. Underground sanitary sewer line crossing (30") at Pacific Ave. Existing Utility Ownership Plans, Utility Note No. 17, Sheet UT20.
9. Underground sanitary sewer line (42") at Pacific Ave. Existing Utility Ownership Plans, Utility Note No. 30, Sheet UT20.
10. Underground water line crossing (48" main) at Pacific Ave. Potential conflict with the widening of Bridges 5/635 E&W. Existing Utility Ownership Plans, Utility Note No. 32, Sheet UT20.
11. Underground sanitary sewer line (42") at Hewitt Ave. Existing Utility Ownership Plans, Utility Note No. 30, Sheet UT20.
12. Underground sanitary sewer line crossing (42") from LL STA 647+00 to LL STA 651+00. Existing Utility Ownership Plans, Utility Note No. 30, Sheet UT20.
13. Underground sanitary sewer line (42") at Everett Ave. Existing Utility Ownership Plans, Utility Note No. 30, Sheet UT21.
14. Underground sanitary sewer line crossing (36" concrete encasement) at LL STA 661+00. Existing Utility Ownership Plans, Utility Note No. 34, Sheet UT21.
15. Underground sanitary sewer line crossing (48" concrete encasement) at LL STA 661+00. Existing Utility Ownership Plans, Utility Note No. 35, Sheets UT21 & UT22.
16. Underground water line crossing (40" main) at LL STA 671+50. Existing Utility Ownership Plans, Utility Note No. 52, Sheet UT22.
17. Underground sanitary sewer line crossing (60" main) at LL STA 671+50. Existing Utility Ownership Plans, Utility Note No. 31, Sheet UT22.

#### **2.10.7.5 Maintenance of Service**

All Utilities shall remain fully operational during all phases of construction except as specifically allowed and approved in writing by the Utility Owner. The Design-Builder shall obtain the Utility Owner's approval in writing prior to any temporary diversion of affected Utility facilities.

#### **2.10.7.6 Traffic Maintenance**

The Design-Builder shall be responsible for all traffic control made necessary by Relocation Work, whether performed by the Design-Builder or by the Utility Owner. Traffic maintenance for Relocations shall be coordinated with, and subject to approval by, the local agency(ies) with jurisdiction. The Design-Builder shall provide traffic staging and detours necessary to ensure proper maintenance of traffic, and street and sidewalk decking where required for the duration of Relocation construction. Traffic control and maintenance of traffic shall comply with Section 2.20.

#### **2.10.7.7 Street Restoration**

The Design-Builder shall ensure that resurfacing, restoration, and re-striping of all streets or other affected areas occur, where necessary due to Relocation Work. Restoration of City of Everett streets shall meet City of Everett standards.

#### **2.10.8 Environmental Compliance Pertaining to Relocation Work**

The Design-Builder shall comply with all applicable Environmental Laws in performance of the Relocation Work, including the requirements of any applicable environmental Governmental Approvals and the Contract Documents. The Design-Builder shall be responsible for performance of all environmental mitigation requirements of any applicable environmental Governmental Approvals, including those related to the Relocation Work.

#### **2.10.9 Maintenance of Records**

##### **2.10.9.1 Construction and Inspection Records**

The Design-Builder shall maintain construction and inspection records in order to ascertain that the work proposed in a Relocation Agreement is accomplished in accordance with the terms and in the manner proposed on the approved plans and otherwise in accordance with the requirements of the Contract Documents.

##### **2.10.9.2 Utility As-builts**

Upon Completion of the Project (or upon completion of the Utility Relocations, if earlier), the Design-Builder shall deliver to WSDOT a complete set of Utility As-built Plans and design files that incorporate all changes and details of the Relocation Work. All As-built Plans shall be of a quality and format acceptable to WSDOT, showing the location of all Utilities within the Project's Right of Way.

##### **2.10.10 Utility Easements**

All Utility easements (existing and proposed) will be identified or described by the Design-Builder in the Final Design Documents. All Utility easements within the Project ROW are subject to prior review and approval by WSDOT.

The Design-Builder is advised that (a) WSDOT does not obtain easements for Utilities outside of State-owned Right-of-Way, and (b) Utility Owners are entitled to reimbursement for their costs of acquiring such easements only if WSDOT determines that they held a pre-existing property right entitling them to such reimbursement.

##### **2.10.11 Known Utilities**

The following is a list of known Utility Owners and respective contact information along with additional general information not referenced in the respective Utility MOUs.

#### **Advanced TelCom**

Bill Cox

Outside Plant & Transport Network Design - Engineer

463 Aviation Blvd., Suite 120

Santa Rosa, CA 95403

Phone: 707-284-4240

bcox@atgi.net

Comment: There are no Advanced TelCom Utilities within the Project area, per letter to WSDOT from Bill Cox (See Advanced TelCom Letter in RFP Appendix U3).

**Allstream, Inc./Plantec**

Dennis Gearhart  
Senior Project Manager  
1326 5<sup>th</sup> Street, Suite C1-C  
Marysville, WA 98270  
Phone: 360-651-2001  
Cell: 360-305-2114  
gearhart@plantec.com

**AT & T**

Cliff Roberts  
11241 Willows Rd. NE  
Redmond, WA 98052  
Phone:  
Fax: 425-986-9931

Comment: Locating and potholing AT&T Utilities can be arranged through Lorin Welanders, AT&T Supervisor, at (206) 382-2868.

**Bonneville Power Administration**

Snohomish Regional Area Office  
914 Avenue D  
Snohomish, WA 98290  
Phone: 360-568-4962

**City of Everett - Sanitary Sewer and water**

Souheil Nasr, P.E.  
Senior Engineer  
3200 Cedar Street  
Everett, WA 98201  
Phone: 425-257-7210  
[snasr@ci.everett.wa.us](mailto:snasr@ci.everett.wa.us)

**Comcast Corporation**

Casey Brown  
Engineering/Construction Coordinator  
1525 75th St SW, Suite 200  
Everett, WA 98203

Phone: 425-263-5345  
Cell: 425-754-0064  
Casey\_Brown2@cable.comcast.com

Comment: Comcast, Snohomish County P.U.D., and Verizon share joint poles and trenches in some locations. At those locations, Comcast anticipates that it can relocate its Utilities within 3 weeks after Snohomish County P.U.D. has been relocated.

**Puget Sound Energy - Natural Gas & Transmission Lines**

Mariamne Kingsbury  
Construction Planning  
3630 Railway Ave.  
Everett, WA 98201  
Phone: 425-356-7511  
Cell: 425-418-7023  
mariamne.kingsbury@pse.com

**Qwest**

Sandra Simmons  
1313 E. Columbia Street, Room 206  
Seattle, WA 98122  
Phone: 206-345-5055  
Sandra.Simmons@qwest.com

Comment: 1) Qwest has submitted a request (Feb.2005) to the FAA (which requires up to 12 months notice) for relocation of the buried fiber optic cable (See confirmation letter in RFP Appendix U3).

2) Fiber sections have to be replaced from existing splice to existing splice.

**Snohomish County P.U.D. - Power**

Jim Jodock  
Highway relocation Engineer  
2320 California Street  
Everett, WA 98201  
Phone: 425-374-4355JDJodock@snopud.com

Comment: Comcast, Snohomish County P.U.D., and Verizon share joint poles and trenches in some locations.

**Sprint**

Wes Carpenter  
Cable Project Engineer  
2606 70<sup>th</sup> Ave. E., Suite 102  
Fife, WA 98424  
Phone: 253-476-6655  
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**Telus**

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7-3777 Kingsway  
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Doug.Brown@TELUS.com

**Verizon**

Wayne Wendell  
Engineer/OSP Engineering  
P.O. Box 1003  
Everett, WA 98206  
Phone: 425-710-4124  
Cell: 425-308-7581  
Fax: 425-710-4152  
wayne.wendell@verizon.com

Comment: Comcast, Snohomish County P.U.D., and Verizon share joint poles and trenches in some locations.

## **2.11 GEOMETRIC DESIGN**

### **2.11.1 General**

Design-Builder shall design and construct the roadways in accordance with the requirements of this Section, including Mandatory Standards and Reference Documents, performance requirements, design and construction criteria, and required submittals.

### **2.11.2 Performance requirements**

The Design-Builder shall provide the engineering services required to furnish the Work identified in the Contract. The services include the tasks of data preparation, data interpretation, and preparation of Design Documents. The Design Documents shall be prepared by (or under the direction of) a Professional Engineer, licensed under Title 18 RCW, State of Washington, and shall carry the Professional Engineer's signature and seal.

The Design-Builder shall design and construct the Project to meet the following:

1. Maintain a safe environment for motorists and give special consideration to avoiding potentially hazardous conditions.
2. Design a roadway meeting the requirements in RFP Appendix M1 – Design Parameters.
3. The Design-Builder shall coordinate and design the Project to accommodate and not preclude or interfere nor require reconstruction for the South Everett P&R Direct Access Channelization Plans– RFP Appendix M6.
4. The Design-Builder shall coordinate and design the Project to accommodate and not require significant reconstruction for the future City of Everett project: 41<sup>st</sup> Interchange Project preferred design alternative as shown in Appendix I - Project Access Point Decision Report (APDR, dated March 2004).

### 2.11.3 Mandatory Standards and Reference Documents

#### 2.11.3.1 Mandatory Standards

**General.** Design-Builder shall design and construct the roadway in accordance with the requirements of the Mandatory Standards listed in Table 2.11.1. The documents in Table 2.11.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.11.1**  
**Mandatory Standards for Roadways**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	N/A		Proposal
2	WSDOT	<i>Project Design Parameters</i>	RFP Appendix M1	2004	DM
3	WSDOT	<i>Design Manual For Design Build Projects</i>	M22-02	2004	RFP Appendix Z
4***	COE	<i>City of Everett Design and Construction Standards and Specifications for developments</i>	N/A	2004	N/A

5	WSDOT	<i>Local Agency Guidelines</i>	M36063	2004	LAG
6	FHWA	<i>Manual on Uniform Traffic Control Devices</i>	(Millennium Edition)		MUTCD
7	AASHTO	<i>Guide for the Development of Bicycle Facilities</i>	I-GBF-3	1999	N/A
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					
*** To be used on the developments of the city of Everett streets.					

### 2.11.3.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.11.2 as supplementary guidelines for the design and construction of the roadway. These Reference Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.11.2**  
**Reference Documents for Roadway**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS-3	2001	“Green Book”
AASHTO	<i>Guide for the Design of High Occupancy Vehicles and Public Transfer Facilities Manual</i>	N/A	1983	N/A
AASHTO	<i>Guide for the Development of Bicycle Facilities</i>	I-GBF-3	1999	N/A
AASHTO	<i>Roadside Design Guide</i>	---	----	----
TRB	<i>Highway Capacity Manual</i>	Special Report 209-	2000	N/A
WSDOT	<i>Plan Preparation Manual</i>	M22-31	2002	PPM
TRB = Transportation Research Board				

### 2.11.4 Design and Construction Criteria

#### 2.11.4.1 Design Criteria

##### 2.11.4.1.1 General

The Project Conceptual Plans – (RFP Appendix M5) were prepared for the Environmental Assessment (RFP Appendix E1) and Access Point Decision Report (RFP Appendix I) for the Project and are conceptual in nature.

If the Project Design Documents require the EA to be supplemented or re-evaluated, or if the conditions stipulated in the Project Permits are not met or requires change(s), it is the responsibility of the Design-Builder to perform any Work necessary as a result thereof.

#### **2.11.4.1.2 Local Roadway Design**

Design-Builder shall obtain all necessary approvals for design elements outside WSDOT ROW limits, as well as for any facilities owned or maintained by local government agencies.

Design-Builder shall coordinate the roadway design with local governing agencies as appropriate and to the satisfaction of the Department.

#### **2.11.4.1.3 Limits of Improvements**

Design-Builder shall provide smooth tie-in and continuity between new construction and existing facilities.

#### **2.11.4.1.4 Concrete Barriers**

##### ***Median Types.***

- All concrete barriers shall be single-slope.
- Design-Builder shall use single slope concrete barrier with a 42" minimum height from finished grade at all locations that require separating traffic from the opposing or adjacent traffic.

#### **2.11.4.1.5 Lanes**

***Lanes Shift and angle point.*** Shifting lanes by creating an angle point shall be in accordance with Figure 620-1 of the WSDOT Design Manual For Design Build Projects.

#### **2.11.4.1.6 State Patrol/ Emergency Response Vehicle Turn Around**

The Design-Builder shall construct a State Patrol/ Emergency Response Vehicle (ERV) Turn Around in the vicinity of MP 191-192.

The minimum requirements for the ERV is a customized AASHTO 2001(US) SU and modified as follows:

Turning radius 18'

Wheelbase: 14.00'

Length: 22.00' (the equivalent of a full size crew cab pickup with an 8' bed).

#### **2.11.4.1.7 Impact Attenuators**

Permanent impact attenuators shall be either the REACT350 or Quadguard Elite. If it is determined that neither of these type fit the application, the Design-Builder shall submit in writing the proposed change identifying at a minimum the location, proposed substitution and the specific rationale why the approved impact attenuators would not be applicable.

Design-Builder shall not use alternate impact attenuators without WSDOT approval.

#### 2.11.4.1.8 Right of Way Fencing

Right of Way fencing shall be installed in accordance with Section 2.14.4.7.6 wherever Right of Way fencing is disturbed, displaced by construction activities, or where Right of Way fencing is shown on the Conceptual Plans.

#### 2.11.4.1.9 Superelevation

WSDOT has evaluated the adequacy of superelevation for 70 mph design speed of existing I-5 mainline in the areas paved with asphalt pavement using the equation provided in Section 642.06 of the Design Manual for Design Build Projects. From that analysis, it has been determined that the Design-Builder shall design and construct superelevation and superelevation transitions of existing and new lanes and shoulders for the following I-5 mainline curves using the full superelevation shown in the table below: Note that for the curves shown in the table below, it will not be sufficient to grind and inlay 0.15 feet of HMA.

PI Station	Full Superelevation
LR 230+36.95	0.08
LR 254+24.37	0.08
LR 294+58.18	0.08 *
LL 441+02.92	0.08

\* For this curve, it may not be possible to achieve full superelevation due to the short length of the curve – Design-Builder shall design and construct appropriate superelevation transitions. Additionally, consider that the 500 foot minimum length of curve criteria has been satisfied due to the spirals.

For all mainline curves not shown in the table above in areas paved with asphalt pavement, use the existing superelevation for existing and new lanes and shoulders.

### 2.11.5 Submittals

#### 2.11.5.1 Channelization Plans for Approval

The Design-Builder shall develop and obtain WSDOT approval for the “Channelization Plans for Approval”, (MP 188.70 to MP 194.80). The Channelization Plans For Approval shall cover mainline, ramp terminals, intersection modifications, impacted city streets and their connection to existing channelization. A draft of the “Channelization Plans For Approval” shall be submitted for comments to WSDOT prior to implementation. The Channelization Plans for Approval shall be revised and re-submitted for WSDOT approval for any revisions made during final design and construction. The Channelization Plans for Approval shall be prepared in accordance with WSDOT Northwest Region Checklist for Channelization Plans “RFP Appendix O3”.

### **2.11.5.2 Project Design File**

The Design-Builder shall prepare the Project Design File by organizing all necessary design documentation for the Project in accordance with RFP Appendix O1 - Project Design Documentation Check List.

### **2.11.5.3 Reports and Summaries**

#### ***Geometric Design Decision Reports***

The Design-Builder shall develop and furnish Design Decision Reports to accompany each Design Document submitted to WSDOT. Such reports shall document decisions made during preparation of the Design Documents regarding components not covered by the Design Parameters and/or, Mandatory Standards.

#### ***Calculations***

The Design-Builder is responsible for completing all the calculations necessary for the design of the Project. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all calculations. The cover page shall include the Contract number, Contract title, and sequential index to calculation page numbers. The calculations shall include but are not be limited to the following:

1. Horizontal and vertical stopping sight distance
2. Superelevations transition, including station rounding adjustment
3. Intersection entering sight distance
4. Profile tie-in calculation at point of beginning and end of alignments
5. Accelerations and decelerations length and tapers
6. Channelization taper rate calculations
7. Calculations establishing horizontal and vertical curve stationing, curve delta, radius, tangent and curve length, northing and easting coordinates at all curve points shall be provided.
8. Barrier/guardrail length of need calculations and Barrier/Guardrail flare rate calculation and determination

All geometric calculations shall be revised and updated to reflect the as-constructed geometry.

## **2.12 BRIDGE AND STRUCTURES**

### **2.12.1 General**

The Design-Builder shall design and construct permanent and temporary structures including bridges, retaining walls, noise walls, traffic barriers, box culverts, pipes, precast concrete arches, sign structures, lighting structures, storm water vaults, and structure retrofits. The

Design-Builder shall coordinate all design with future projects within the design area including, but not limited to, the City of Everett's proposed 41<sup>st</sup> Street Interchange.

Plans of the existing bridges are found in RFP Appendix N. The plans of the existing bridges are not guaranteed to be dimensionally accurate. The Design-Builder shall field measure existing dimensions as required.

## 2.12.2 Mandatory Standards and Reference Documents

### 2.12.2.1 Mandatory Standards

**General.** Design-Builder shall design and construct the roadway in accordance with the requirements of the Mandatory Standards listed in Table 2.12.1. The documents in Table 2.12.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

The list in the table below is not complete, and other applicable publications may be required to complete all bridge and structures design elements.

**Table 2.12.1**  
**Mandatory Standards for Structures**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Everett HOV Design-Build Project			Proposal
2	WSDOT	<i>Design Manual For Design Build Projects</i>	M22-02		RFP Appendix Z
3	WSDOT	<i>Geotechnical Design Manual</i>		2004	RFP Appendix G3
4***	WSDOT	<i>LRFD Bridge Design Manual</i>	M23-50		
5	AASHTO	<i>LRFD Bridge Design Specifications, U.S. Units, 3<sup>rd</sup> Edition</i>		2004	
6	FHWA	<i>Seismic Retrofitting</i>	FHWA-		

		<i>Manual for Highway Bridges</i>	RD-94-052		
7	WSDOT	<i>Construction Manual</i>	M41-01		
8	AASHTO	<i>Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals, 4<sup>th</sup> Edition</i>		2002 & 2003 Interim revisions	
9	AASHTO	<i>Guide Specification for Structural Design of Sound Barriers</i>		1989 w/ 1992 & 2002 interim revisions	
10	AASHTO	<i>Bridge Welding Code: AASHTO/AWS D1.5M-D1.5: 2002, An American National Standard</i>		2003 interim revisions	
11	AASHTO	<i>Manual for Condition Evaluation of Bridges, 2<sup>nd</sup> Edition</i>			
12	WSDOT	<i>Maintenance Manual</i>	M51-01		
13	WSDOT	<i>Plans Preparation Manual</i>	M22-31		
14	WSDOT	<i>Hydraulics Manual</i>	M23-03		
15	WSDOT	<i>Materials Manual</i>	M46-01		
16	WSDOT	<i>Qualified Products List</i>	M46-02		
<p>** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.</p> <p>***Document modified for design-build.</p> <p>ANSI = American National Standards Institute</p> <p>AWS = American Welding Society</p> <p>BNSFRR = Burlington Northern Santa Fe Railroad</p>					

### 2.12.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.12.2 as supplementary guidelines for the design and construction of the roadway. These Reference Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.12.2**  
**Reference Documents for Structures**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
------------------	-------	------------------------	------	-----------------------

AASHTO	<i>Guide Design Specification for Bridge Temporary Works</i>		1993 & interim revisions	
AASHTO	<i>Guide Standard Specifications for Bridge Temporary Works</i>		1993 & interim revisions	

### 2.12.3 Performance Requirements

#### 2.12.3.1 General

The Design-Builder shall design and construct the bridges and other structures to provide a complete and functional system that provides functionality, durability, ease of maintenance, safety and a pleasing aesthetic theme.

#### 2.12.3.2 Bridge Performance Requirements

The Design-Builder shall comply with the seismic design requirements for all new structures and widened portions of existing structures as stated in WSDOT *LRFD Bridge Design Manual*. The Design-Builder shall use a Multimode Spectral Analysis as defined in Section 4.7.4 of the AASHTO *LRFD Bridge Design Specifications* with a seismic acceleration coefficient of 0.30.

The Design-Builder shall coordinate and design Bridge 5/628W – Southbound mainline I-5 and Bridge 5/628N-N to accommodate and not require significant reconstruction for the future City of Everett project: 41<sup>st</sup> Interchange Project preferred design alternative as shown in Appendix I - Project Access Point Decision Report (APDR, dated March 2004).

The Design-Builder shall design and construct seismic retrofits on the following bridges as described in Section 2.12.4.3:

1. 5/626W
2. 5/626E
3. 5/631W
4. 5/631E

The Design-Builder shall provide a surface smoothness for bridge decks and approach slabs in accordance with WSDOT *Standard Specification* Section 5-05.3(3) E.

For the bridges listed in Table 2.12.3, all bridge rails shall be retrofitted to meet current design standards.

**Table 2.12.3**  
**Existing Bridge Widening Geometrics**

Bridge No.	Location	No. of New Lanes	Existing and New Lane Width (ft)	New Shoulder Width (ft)
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5/626W	I-5 SB over Lowell Road	5	12.00	10.00 Lt, 10.00 Rt
5/626E	I-5 NB over Lowell Road	5	12.00	10.00 Lt, 10.00 Rt
5/631W	I-5 SB over Abandoned Railroad	5	12.00	10.00 Lt, 9.25 Rt
5/631E	I-5 NB over Abandoned Railroad	5	12.00	9.25 Lt, 10.00 Rt
5/632W	I-5 SB over Smith Avenue	5	12.00	10.00 Lt, 9.25 Rt
5/632E	I-5 NB over Smith Avenue	5	12.00	9.25 Lt, 10.00 Rt
5/633W	I-5 SB over 36 <sup>th</sup> St. and BNSF Railroad	5	12.00	10.00 Lt, 6.00 Rt
5/633E	I-5 NB over 36 <sup>th</sup> St. and BNSF Railroad	5	12.00	6.00 Lt, 10.00 Rt
5/635W	I-5 SB over Pacific Avenue	5	12.00	10.00 Lt, 9.25 Rt
5/635E	I-5 NB over Pacific Avenue	5	12.00	9.25 Lt, 10.00 Rt
5/636W	I-5 SB over Hewitt Avenue	4	12.00	10.00 Lt, 9.25 Rt
5/636E	I-5 NB over Hewitt Avenue	4	12.00	9.25 Lt, 10.00 Rt
5/638W	I-5 SB over SR2	5	12.00	10.00 Lt, 8.50 Rt
5/638E	I-5 NB over SR2	5	12.00	8.50 Lt, 10.00 Rt
5/640W	I-5 SB over Everett Avenue	5	12.00	10.00 Lt, 9.25 Rt
5/640E	I-5 NB over Everett Avenue	5	12.00	9.25 Lt, 10.00 Rt

**Table 2.12.4**  
**New Bridge Geometrics**

Bridge No.	Location	No. of New Lanes	New Lane Width (ft)	Shoulder Width (ft)
Aqueduct	Water Quality Site #1	N/A	N/A	N/A
5/628W	I-5 SB over HOV Direct Access	5	12.00	10.00 Lt, 10.00 Rt
5/628N-N	I-5 NB off ramp over I-5 NB & SB	2	12.50	4.00 Lt, 8.00 Rt
2/1W-S	SR2 WB off ramp to I-5 SB	1	15.00	4.00 Lt, 8.00 Rt
5/636N-E	I-5 NB off ramp to SR2 EB	1	15.00	4.00 Lt, 8.00 Rt

The following bridges shall receive traffic barrier retrofits:

1. Bridge 5/622S-S
2. Bridge 99/610

The following bridges shall have 42” barriers on the inside and the typical 34” on the outside:

1. 5/631E&W
2. 5/632E&W
3. 5/633E&W
4. 5/635E&W
5. 5/636E&W
6. 5/638E&W
7. 5/640E&W

The Conceptual Plans included in the RFP Appendix M show layouts and conceptual structure types for all new bridges and existing bridges to be widened. The Conceptual plans do not address bridge traffic barrier retrofits.

### Vertical Clearance Over City Streets

The minimum vertical clearance under the widened existing bridges over city streets shall be 15'-6" under the entire structure except at Lowell Road Bridge No. 5/626W where the existing minimum vertical clearance shall not be reduced. Coring data and barrier/deck elevation data for Bridge 5/635W is found in Appendix N1. The Design-Builder is alerted that the bridge overhead clearance at Pacific Avenue & Smith Avenue is currently less than 15'-6". The Design-Builder shall maintain existing or improve the vertical clearance for Bridge 5/629A that spans over SB Broadway On Ramp and Proposed HOV direct Access ramps "Existing NB Broadway Off Ramp". At all other highway locations the minimum vertical clearance shall be 16'-6". The minimum vertical clearance during construction shall be 16'-6" over I-5 and 14'-6" (for box girder bridge construction only) over US 2 and city streets.

### Vertical Clearance Over Railroad

The minimum vertical clearance for bridge 5/633W over the northerly tracks is 22.94 feet. The minimum vertical clearance for bridge 5/633W over the southerly tracks is 23.5 feet. The minimum vertical clearance under bridge 5/633E over all tracks is 23.5 feet. The minimum vertical clearance under the aqueduct bridge to the railroad track shall be 23'-6".

### 2.12.3.3 Retaining Wall Performance Requirements

Retaining walls shall meet the performance requirements of the WSDOT *Geotechnical Design Manual*, The WSDOT *LRFD Bridge Design Manual* and the AASHTO *LRFD Bridge Design Specifications*.

### 2.12.3.4 Noise Wall Performance Requirements

The Design-Builder shall design and construct noise walls at the following locations in the Conceptual Plan alignment stationing and noise wall designation:

1. Noise Wall NW1	LR 226+03	to	LR 241+90
2. Noise Wall NW1B	LR 240+10	to	LR 245+78
3. Noise Wall NW2	LL 458+10	to	LL 526+80
4. Noise Wall NW2B	LR 313+59	to	LR 326+40
5. Noise Wall NW3	FR 17+30	to	FR 29+40
6. Noise Wall NW3B	LR 355+31	to	LR 370+26
7. Noise Wall NW4	LL 658+25	to	LL 680+30
8. Noise Wall NW5	LR 451+50	to	LR 469+30
9. Noise Wall NW6	LR 469+50	to	LR 489+50
10. Noise Wall NW7	LL 680+50	to	LL 698+00

The noise wall beginning and ending stations shown here are approximate. Noise wall heights and elevations are shown in RFP Appendix M – Conceptual Designs. Top of wall elevations are minimum. Noise wall alignments may be shifted up to 12' horizontally left or right as long as the noise wall remains within the Right of Way and the top of wall elevations remains the same as in RFP Appendix M – Conceptual Designs. For any horizontal alignment change greater than 12' the noise wall shall be relocated and reanalyzed. If the mainline horizontal alignment changes from Conceptual Designs more than 12' left or right,

then noise wall re-analysis will be required. Raising the mainline vertical profile more than 1' from the Conceptual Designs will require raising the noise wall elevations the same amount as the vertical profile. For horizontal wall realignments within 12', the Design-Builder shall verify that the line of sight between traffic and the receiver is still blocked by the noise wall. Where wall re-analysis is required, the Design-Builder shall re-analyze and re-design noise walls to match or exceed the noise reductions for receivers as documented in the Environmental Assessment or noise reports conducted subsequent to the Environmental Assessment. The Design-Builder shall also prepare a Noise Abatement Design Report in accordance with state and federal guidelines and regulations that confirms noise wall heights to alignments, or includes elevation of the alternative designs, specifies materials types and treatments, and provides a summary of the coordination with communities, if any.

Noise wall design and construction shall implement the requirements and goals of Section 2.14 – Roadside Restoration and Aesthetics. Top of wall elevations shown in RFP Appendix M shall be maintained if the wall is modified for aesthetic considerations.

The requirements for fire and maintenance shall be investigated and provided for by the Design-Builder. The Design-Builder shall provide a gravel access road from the outside shoulder of Northbound I-5 to the gate in the limited access fence near LR Sta. 237+00. The gravel access road shall accommodate the City of Everett's Fire Trucks and be a minimum of 20' wide and have a minimum turning radius of 35'.

## **2.12.4 Design and Construction Criteria**

### **2.12.4.1 Design Criteria**

The Design-Builder shall utilize the Mandatory Standards and Reference Documents with the Design Criteria listed below in developing the design of the bridges and structures. If any of the Design Criteria are not achievable, the Design-Builder shall submit to the Department documentation of what cannot be achieved and a proposed alternative for review and approval. The Design-Builder shall not proceed with proposed alternative design criteria until a change to the Contract is approved.

### **2.12.4.2 Personnel Requirements**

The Design-Builder shall provide a Structural Design Manager with the following responsibilities and qualifications:

The Structural Design Manager shall be responsible for ensuring that the bridge and structures design is completed and design criteria requirements are met. The Structural Design Manager must be on Site whenever design activities are being performed.

The Structural Design Manager shall be a registered Structural Engineer in the State of Washington at the time of the Notice to Proceed. The Structural Design Manager shall work under the direct supervision of the Design-Builder's Design Manager.

The Structural Design Manager shall have at least ten years of recent experience in managing the design of highway bridges and structures including five years experience designing or managing the design of highway bridges in Washington State. The Structural Design Manager shall be familiar with all applicable structural design codes including the WSDOT *LRFD Bridge Design Manual* and the AASHTO *LRFD Bridge Design Specifications*, 3<sup>rd</sup> Edition, and shall be knowledgeable of current practice for the seismic design of bridge and structures in Washington State.

#### **2.12.4.3 Bridge Design Criteria**

New bridges and bridge widening shall be designed using Load and Resistance Factor Design in accordance with WSDOT *LRFD Bridge Design Manual* and AASHTO *LRFD Bridge Design Specifications*. The deflection criteria in AASHTO *LRFD Bridge Design Specifications*, Section 2.5.2.6.2 shall be met for all permanent structures. All bridges carrying I-5 shall be classified as essential bridges as defined in Section 3.10.3 of the AASHTO *LRFD Bridge Design Specifications*. The widened portion of existing bridges shall match the roadway grade and superelevation of the existing bridges.

##### **Pedestrian Bridge**

Total bridge deck width shall be a minimum of 10' plus 1' each side for barrier equaling 12'.

Bridge design criteria shall be per AASHTO *LRFD Bridge Design Specifications*, U. S. Units, 3<sup>rd</sup> Edition, 2004. For loading Extreme Event II a water dead load equivalent to the drainpipe being full shall be added.

Deck Protective System 1, epoxy-coated top mat steel reinforcing bars with 2 ½ inches cover shall be used on all new concrete bridge decks. On bridge widening, Deck Protective System 1 shall be finished flush with the top surface of the adjoining existing concrete bridge deck or concrete overlay.

Deck Protection System 3, hot mix asphalt (HMA) overlay with membrane waterproofing shall only be used on widening of existing bridges with HMA overlays. Where noted in the plans, the existing waterproof membrane and asphalt concrete pavement overlay shall be removed and replaced with Deck Protective System 3. The existing waterproof membrane and asphalt concrete pavement overlay on the bridge decks of Bridge Nos. 5/626E&W shall be fully removed and replaced with Deck Protective System 3 and HMA overlay.

Concrete overlays used for the purpose of reprofiling an existing bridge deck shall be 1 ½ inch minimum modified concrete overlay placed over 1 inch minimum concrete cover remaining over the existing top mat of steel reinforcing bars after scarifying the existing bridge deck. The maximum thickness of the existing deck plus the added modified concrete overlay shall be determined by load rating the bridge and shall have received the approval of the Department before proceeding. Concrete overlays shall conform to WSDOT *Standard Specification* Section 6-09, and shall be either fly ash modified concrete, latex modified concrete, or microsilica modified concrete.

It is not necessary to perform a seismic analysis for the existing portion of a widened structure unless the widening method is expected to change (increase) the seismic moments

and shears in the existing substructure. A seismic analysis will be required on bridges widened without the addition of substructure. Existing portions of the widened bridges shall be seismically retrofitted as follows:

Existing Bridge 5/626E and 5/626W (over Lowell Road) shall receive substructure retrofit consisting of column jacketing of all existing columns at Piers 2 and 3 as required by the WSDOT *LRFD Bridge Design Manual* and the FHWA *Seismic Retrofitting Manual for Highway Bridges*.

Existing Bridges 5/631E and 5/631W shall receive substructure retrofit consisting of column jacketing of existing columns at piers 2 and 3 as required by seismic analysis and a superstructure seismic retrofit consisting of longitudinal restrainers and lateral girder stops at piers 2 and 3 as required by WSDOT *LRFD Bridge Design Manual* and FHWA *Seismic Retrofitting Manual for Highway Bridges*.

The Design-Builder shall not use masonry, timber, or aluminum materials for permanent bridge superstructures or substructures. The Design-Builder shall not use lightweight concrete for permanent bridge superstructures or substructures unless approved by WSDOT.

The Design-Builder shall not design bridges with intermediate hinges. A minimum of three girders shall be used to provide redundant load path structures.

Prestressed concrete and steel plate girders shall be designed to carry the weight of the fluid concrete deck as well as their own weight without shoring.

Single and multi-span bridges shall be designed as simple span for all dead and live loads. Continuity reinforcement at intermediate piers shall be provided in the bridge deck to resist negative moments due to live load and superimposed dead loads. Multi span bridges shall have the same depth girder in all spans, except where minimum vertical clearance requires the use of shallower depth girders.

Spliced prestressed concrete girders shall have cast-in-place concrete closures constructed in the field.

For widenings, girder types similar to the existing girders shall be used. Wide flange prestressed concrete girders shallower than the existing girders may be used if required to achieve the required minimum vertical clearance. The widening shall maintain live load deflection characteristics similar to those of the existing superstructure. For Bridges 5/638W and 5/638E, steel brackets may be used to support the inside (median) widening in order to reduce the weight to prevent extraordinary upgrades to the box girder, columns, and footings.

Steel girder superstructures shall not be fracture critical. The main longitudinal load carrying girders shall be welded plate girders cambered during fabrication. Heat cambered rolled girders shall not be used except as secondary members or temporary girders. Steel girder superstructures shall have a cast-in-place reinforced concrete roadway deck designed to be composite for live loads.

Steel superstructures shall be designed for AASHTO M270 Grade 36, Grade 50, or Grade 70 steel, or combinations of those grades and shall be painted with the WSDOT standard 3-coat system in accordance with Section 6-07 of the WSDOT *Standard Specifications*.

Bridge roadway decks shall be cast-in-place and have a minimum thickness of 7 ½ inches, 8 ½ inches when stay-in-place deck panels are used, or 7 inches when an overlay is used. Precast stay-in-place deck panels may be used with limitations specified by the WSDOT *LRFD Bridge Design Manual*. Steel stay-in-place forms shall not be used except in concrete box girder cells with no access openings. Widening shall have closures in crossbeams, diaphragms, and the roadway deck between the widening and the existing structure. Superstructure closures shall be constructed after the formwork and falsework has been removed and all immediate dead load superstructure deflection has taken place. Traffic barriers shall be constructed after the diaphragm and deck closures are constructed.

Longitudinal expansion joints shall not be used. Transverse expansion joints may be used in widenings only if the existing bridge has transverse expansion joints and they shall align with the existing expansion joints. All expansion joints shall be watertight. Adequate shelf width per WSDOT *LRFD Bridge Design Manual* shall be provided at piers with expansion joints. Seismic Restrainers shall be provided at all intermediate piers with expansion joints.

Bridge bearings and expansion joints shall be designed to provide for maintenance accessibility and future replacement. Loads used for the design of jacking locations shall be 200% of the calculated lifting load.

Pier support for widenings shall be located in line with pier support of the existing bridge being widened. Bearing types and type of fixity (superstructure to substructure) shall be similar to the existing bridge. The superstructure to substructure connection at all intermediate piers shall be a moment-resistant fixed diaphragm in accordance with the WSDOT *LRFD Bridge Design Manual*, except for bridge widenings with expansion joints at intermediate piers and multi-span steel girder superstructures.

Column and abutment types for widenings shall be similar in appearance and structure type to the existing columns and abutments. Precast columns and precast bent caps may be used with concurrence of the Department.

Bridge abutments, wingwalls, curtain walls and retaining walls located between abutment walls shall be cast-in-place reinforced concrete. Where structural earth (SE) walls adjoin bridge abutments or curtain walls the joint shall be a single vertical joint full height to the bottom of the traffic barrier. Curtain walls at bridge abutment wall corners shall be cast-in-place walls integral with the abutment walls and extend to the back of the footings.

Wingwalls, curtain walls and retaining walls shall be used as required by slope geometry and under-bridge clearances. They shall prevent soil slopes spilling onto girders and bearings. The top of the slope at bridge ends shall conform to WSDOT Standard Plan H-9. Side slopes of bridge approaches and shoulder widenings for guardrail or concrete barrier shall conform to requirements of WSDOT *Design Manual For Design Build Projects* (RFP Appendix Z). End slopes under bridge abutments shall be no steeper than 2 to 1 (horizontal to vertical).

The geotechnical investigation may allow a steeper slope in which case the end slopes may be no steeper than 1 ½ to 1.

The bridge substructures and foundations shall be designed in accordance with the WSDOT *Geotechnical Design Manual* (RFP Appendix G3).

All concrete slope protection work shall be accomplished in accordance with WSDOT Standard Plan D-9. The following conditions shall determine the application of the required concrete slope protection:

1. All new bridges identified in the RFP or proposed by the Design-Builder shall have concrete slope protection.
2. All existing bridges identified in the RFP as being included in this Project, or existing bridges that the contractor has determined need to be widened that do not currently have concrete slope protection, shall have it added at each embankment slope to the full width bridge limits.
3. All existing bridges identified in the RFP as being included in this Project with damaged concrete slope protection shall have it repaired.
4. Concrete slope protection will not be required for those bridge structures not identified in the RFP as being apart of this Project.

Drilled shafts, piles (steel and cast-in-place concrete in accordance with Sections 6-05 & 9-10 of the WSDOT *Standard Specifications*) and spread footings recommended by the Geotechnical Report may be used for bridge foundations. Unfilled, unreinforced steel pipe piles, prestressed piles, augured cast piles, and bell end shafts shall not be used for bridge foundations. Battered piles may be used upon approval of the WSDOT Engineer.

For Bridge No. 5/628n-n it is acceptable to use 3 girders instead of the 4 required in Section 2.3.1(H) of the Bridge Design Manual. The Design-Builder shall use HS-25 for strength and overload checks, and fixed axle HS-20 for fatigue checks, per AASHTO 17<sup>th</sup> edition and the 2003 guide spec for curved girders.

The Design-Builder shall design and construct bridges 5/633E&W taking into consideration and accommodating proposed railroad tracks in the immediate vicinity east of bridges as shown in the Appendix R1 – **Proposed Right of Way Modifications**.

#### **2.12.4.4 Acceptable Bridge Types**

Allowable bridge girder types are as follows:

Prestressed Concrete Girders of only the following types as defined in WSDOT *Standard Specifications* Section 6-02.3(25):

1. Prestressed Concrete I Girders
2. Prestressed Concrete Wide Flange I Girders
3. Thin Flange Deck Bulb Tee Girders
4. Spliced Prestressed Concrete Girders
5. Prestressed Concrete Tub Girders

Concrete Slabs (both conventionally reinforced and post-tensioned)  
Concrete Box Girders (both conventionally reinforced and post-tensioned)  
Steel Plate Girders  
Steel Box Girders

#### **2.12.4.5 Bridge Approach Slabs**

The Design Builder shall construct bridge approach slabs meeting the requirements of the WSDOT Standard Plans (Appendix C) for the following:

- The Design-Builder shall construct bridge approach slabs at each end of all bridges that are completely new and are not widened (e.g. 5/628n-n, 5/636n-e, and 2/1w-s). The bridge approach slabs shall be constructed to provide full width bridge deck approach slabs.
- For existing bridges that are to be widened and have pre-existing bridge approach slabs, the Design-Builder shall construct new bridge approach slabs so as to provide bridge approach slabs across the full width of the bridge deck. It will not be necessary to replace existing bridge approach slabs.

The Design-Builder will not be required to construct bridge approach slabs across existing lanes for existing bridge ends that do not currently have any existing bridge approach slab.

#### **2.12.4.6 Bridge and Retaining Wall Traffic Barriers**

Bridge traffic barriers shall be Single Slope reinforced concrete traffic barriers, 2'-10" high in accordance with the WSDOT *LRFD Bridge Design Manual* unless noted otherwise.

The traffic barriers for bridges 5/631 E&W, 5/632 E&W, 5/633 E&W, 5/635 E&W, 5/636 E&W, 5/638 E&W and 5/640 shall be 3'-6" high. On twin overcrossings where the traffic barriers at the median are back to back (Bridges 5/631E and 5/631W, 5/632E and 5/632W, 5/635E and 5/635W, 5/636E and 5/636W, 5/640E and 5/640W) the gap between the backs of the barriers shall be large enough to allow independent movement during a seismic event and shall allow slip forming of the barriers. If the gap exceeds 6 inches but is less than 5'-0", then a chain-link safety net shall be constructed between the two bridges.

The twin overcrossings (Bridges 5/633E and 5/633W and Bridges 5/638E and 5/638W) shall have chain link safety net constructed between the twin bridges. The safety net shall be a minimum of 1 foot below the top of the lower barrier and located level transverse to the bridges.

Two 2-inch diameter galvanized rigid steel conduit pipes with junction box pairs (one for each conduit pipe) spaced at 180 foot maximum centers shall be cast into all traffic and pedestrian barriers placed on bridge superstructures, bridge approach slabs and all reinforced concrete retaining walls and structural earth walls which extend the ends of the bridge parallel to the mainline for all bridges carrying I-5 traffic. The conduit pipes shall be stubbed

into type 1 junction box pairs within fifteen feet of the exit from a traffic or pedestrian barrier.

All bridge rail retrofits shall be in accordance with the WSDOT *LRFD Bridge Design Manual*. In locations where an existing concrete bridge rail is being removed and replaced with another concrete rail, the slab cantilever shall be designed according to Section 10.2.4. All other retrofit locations shall be designed in accordance with Section 10.4.

Precast traffic barriers shall not be used for permanent structures. Precast traffic barriers may be used as temporary concrete barriers for the channelization of traffic during construction.

Structure number plates shall be removed from traffic barriers, railings, walls, or columns being removed and shall be reinstalled or replaced on new traffic barriers, walls, or columns. If damaged, before or during removal, the structure number plates shall be replaced.

#### **2.12.4.7 Bridge Drainage**

Where bridge deck drainage is required by hydraulic analysis, catch basins or grate inlets off the ends of the bridge shall replace existing bridge drains in the bridge decks wherever possible. Existing bridge drain basins shall be plugged with concrete, and existing drainpipes from the basins shall be removed.

Storm drainpipe hung under the bridges superstructures shall be steel pipe and shall not be visible in the elevation view of the bridges.

#### **2.12.4.8 Bridge Inspection Access**

All bridge superstructures, joints, and bearings shall be made accessible for long-term inspection and maintenance. Open-framed superstructures shall be designed to be accessible by ladder or a “UBIT” (under-bridge inspection truck) per the WSDOT *LRFD Bridge Design Manual*.

Concrete box girders containing utilities shall be made accessible for inspection and maintenance. Access doors shall swing into the box and have locking mechanisms. Access doors shall be placed at locations that do not impact traffic under bridges and away from areas easily accessible to the public. Steel box girders shall be made accessible for interior inspection. Box girders shall be ventilated and shall be designed to prevent access of vermin.

#### **2.12.4.9 Bridge Load Ratings**

The Design-Builder shall load rate all new, widened, and rehabilitated vehicular bridges and all storm water vaults that carry vehicular loads. The minimum length of structures that are required to be load rated shall be 20 feet measured from back to back of pavement seats along the centerline of the roadway. The bridges shall be load rated using methods described in the WSDOT *LRFD Bridge Design Manual* Chapter 13. A load rating report as described in Section 13.4 of the WSDOT *LRFD Bridge Design Manual* shall be completed and submitted to WSDOT before the bridge is opened to vehicular traffic.

The Design-Builder shall load rate the bridges and vaults using BRIDG software. If BRIDG is unable to rate the structure type, then another commercially available software may be used subject to prior approval by WSDOT.

#### **2.12.4.10 Temporary Bridge Design Criteria**

“Temporary bridge” refers to any bridge or portion of bridge that will carry public traffic but will not remain upon Completion of the Contract. Temporary bridge does not include falsework, shoring, or temporary Work access structures or equipment support structures. Haul bridges that will carry construction traffic over a public road shall be designed as temporary bridges.

Temporary bridges shall be designed in accordance with the requirements of WSDOT *LRFD Bridge Design Manual* and AASHTO *LRFD Bridge Design Specifications* and applicable sections of the AASHTO *Guide Design Specifications for Bridge Temporary Works*. In addition, haul bridges shall be designed for any live loads that exceed HL-93 live load and shall have live load deflections less than  $L/800$ .

The WSDOT shall approve the roadway width and lateral clearance for temporary bridges. All temporary bridges over I-5 shall provide 16.5-foot minimum vertical clearance over I-5 at all times.

The following components will be allowed for temporary bridge construction:

1. The Design-Builder may use concrete abutments or spread footings supported on or adjacent to Structural Earth walls for abutments. The Design-Builder may use steel sheet piling walls or timber lagging between piling for abutments. The measured and calculated horizontal deflection at any location at the top of abutments and walls shall not exceed double the horizontal deflection allowed for permanent construction.
2. The Design-Builder will be allowed to use timber, steel, precast or cast-in-place concrete piles for temporary bridges.
3. The Design-Builder shall design the piers as pile bents or posts on mudsills or spread footings braced against lateral loads, and the pier caps shall be reinforced concrete or steel beams.
4. The Design-Builder may use glue-laminated or nail-laminated timber deck panels, precast concrete deck panels or cast-in-place reinforced concrete for construction of the deck. Stay-in-place steel forms may be used. Previously used deck panels shall not be cracked and have only minor surface defects.
5. The Design-Builder shall overlay the deck panels with a minimum 2-inch-thick bituminous wearing course. The minimum cross slope of the bituminous wearing course shall be 0.01 foot per foot. The driving surface shall have an initial skid number of 35 and maintain a minimum skid number of 26 in accordance with AASHTO T22.

6. The Design-Builder shall use either steel or concrete beams in the superstructure.
7. The Design-Builder may use salvaged structural members meeting the following conditions:
  - a. The Design-Builder shall provide documentation showing that the structural members meet all appropriate material properties for their intended function such as: dimensions, yield strength, tensile strength, ductility, toughness, chemistry, weldability and corrosion resistance. Material testing of the structural members may be required in order to provide documentation that the appropriate material properties have been met.
  - b. Salvaged steel beams shall have no areas of detrimental section loss due to corrosion.
  - c. All holes in structural members shall be less than 1 inch in diameter and shall be round.
  - d. All shop and/or field splices shall be bolted.
  - e. Salvaged prestressed concrete beams shall have no exposed strands and no defects, spalls, or cracks deeper than 1 inch. Beam design sheets shall be provided indicating concrete strength, strand type and pattern, shear reinforcement, and other pertinent information.
8. All precast concrete girders in WSDOT *Standard Specification* Section 6-02.3.(25) are allowed for temporary bridges.
9. The Design-Builder shall use temporary barriers as detailed in the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction*.
10. The Design-Builder may temporarily widen existing bridge structures if required. The temporary widened portion shall meet the requirements for temporary bridge construction as stated in this Section.
11. The erected temporary bridge shall be inspected in the field by the Design-Builder's Engineer responsible for design for compliance with the Released-for- Construction plans. Any variation of the erected bridge from the Released-for-Construction plans shall be reviewed and approved by the Design-Builder's Engineer and brought to the attention of the Department.
12. Maintenance of temporary bridges shall be the Design-Builder's responsibility.

#### **2.12.4.11 Temporary Works – Falsework, Forms, and Shoring**

Temporary works including falsework, formwork, shoring, temporary work access structures or equipment support structures shall be designed and constructed in accordance with the WSDOT *LRFD Bridge Design Manual*, the WSDOT *Standard Specifications for Road, Bridge and Municipal Construction*, the AASHTO *Guide Design Specifications for Bridge*

*Temporary Work*, the AASHTO *Guide Standard Specifications for Bridge Temporary Works* and the WSDOT *Geotechnical Design Manual*.

#### **2.12.4.12 Wall Design Criteria**

Retaining walls and Noise Walls shall be designed and detailed in accordance with the WSDOT *LRFD Bridge Design Manual* and the WSDOT *Geotechnical Design Manual*. Wall type selection and design by the Design-Builder shall meet all applicable requirements for differential settlement, aesthetic design, Utility location, lighting, signage, and landscaping.

Permanent retaining walls shall have cast-in-place or precast concrete faces or rock faces in accordance with the Aesthetic Design Standards. Gravity block walls and bin walls shall not be used for permanent retaining walls. Geosynthetic walls without a permanent facing (shotcrete or concrete) shall not be used for permanent retaining walls.

Retaining Wall types allowed are as follows:

1. Reinforced Concrete Walls
2. Noise Barrier Walls
3. Structural Earth Walls
4. Permanent geosynthetic Walls
5. Soil Nail Walls
6. Soldier Pile Walls
7. Soldier Pile Tieback Walls
8. Gabion Cribbing
9. Rock Walls

For reinforced concrete retaining walls, geosynthetic retaining walls, and gabion walls, the Design-Builder shall use standard walls in the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction*. The retaining wall standard plans can be modified by the Design-Builder to meet aesthetic design requirements for the Project but the modifications shall not adversely affect the strength and safety requirements of the retaining walls.

Proprietary wall systems currently preapproved by WSDOT for use as structural earth wall systems for wall heights of 30 feet or less are as follows:

1. Welded wire faced structural earth wall systems from manufacturers specified in WSDOT GSP 13031.GB6.
2. Precast concrete panel faced structural earth wall systems from manufacturers specified in WSDOT GSP 13032.GB6.
3. Precast concrete block faced structural earth wall systems from manufacturers specified in WSDOT GSP 13033.GB6.

Other proprietary wall systems not yet pre-approved by WSDOT for use as structural earth wall systems may be used if approved by the Department. The Design-Builder shall submit to the Department for review:

1. Six copies of The Highway Innovative Technology Evaluation Center (HITEC), 1015 15th Street NW, Suite 600, Washington DC 20005 review report.
2. Six copies of the design calculations (by hand) for example wall designs at 10', 20', and 30' heights including seismic design.

Approval of a proprietary wall system under this process, by itself, will not be considered sufficient for attaining pre-approval status from WSDOT.

Soil nails in soil nail walls shall be double corrosion protected (i.e., fully encapsulated) in the portion of the wall that supports loading from adjacent structures. Soil nails with epoxy coating are acceptable elsewhere. All permanent ground anchors and deadman anchor cables or bars shall be double corrosion protected.

All walls within the project limits shall meet the Washington State Department of Labor and Industries requirements for fall protection. Where new walls are built, the wall height shall be extended to meet fall restraint requirements. For existing walls, standard cable rail shall be added, in accordance with WSDOT Design Manual Section 1130.04(7)(b), with posts painted Mt. St. Helens Gray.

#### **2.12.4.13 Temporary Retaining Wall Design Criteria**

The Design-Builder shall design temporary retaining walls in accordance with the WSDOT *LRFD Bridge Design Manual*, the WSDOT *Geotechnical Design Manual*, and applicable sections of the *AASHTO Guide Design Specifications for Bridge Temporary Works*. Structural components of temporary retaining walls may be reused as part of permanent retaining wall systems provided all of the structural support elements and materials of the permanent retaining walls meet the requirements for permanent structures. Maintenance of temporary wall structure shall be the Design-Builder's responsibility.

#### **2.12.4.14 Noise Wall Design Criteria**

Noise wall type selection and design shall meet all applicable requirements including those related to environmental compliance, aesthetic design, utilities, lighting, signage, and landscaping. The Design-Builder shall use standard noise walls in the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction* (RFP Appendix C) when the site foundation conditions meet minimum allowable bearing pressures for spread footings or minimum strength requirements for shaft and trench foundations. The noise wall standard plans can be modified by the Design-Builder to meet the aesthetic design requirements for the Project but the modifications shall not adversely affect the strength and safety requirements of the noise walls.

Design and construction of noise walls shall be in accordance with the AASHTO *Guide Specification for Structural Design of Sound Walls*. Noise walls shall be designed using an exposure B2 and a design wind speed of 90 MPH. Noise walls shall be constructed of precast concrete, cast-in-place concrete or reinforced concrete masonry. Timber and gravity block (ecology block) noise walls shall not be used. Other products may be considered with the approval of the Department.

Noise wall types D-2e, D-2f, and D-2g from the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction* (RFP Appendix C) shall only be used where the noise wall transitions into a bridge. Elsewhere, noise wall shall not be placed on the top of barriers. WSDOT does not want the proximity of the noise walls to the roadway to create a driving experience that instills a sense of “confinement” or “driving in a slot”. WSDOT’s conceptual design takes this into account. Therefore, Design-Builder shall not locate noise walls closer to driving lanes than shown in Appendix M5 without WSDOT concurrence.

Fire hydrant access openings shall be provided adjacent to fire hydrant locations as authorized by WSDOT and each responsible local fire marshal having jurisdiction. Openings shall be provided per NFPA or other approved details and locations shall be readily accessible to both emergency vehicles and water supply service lines.

For maintenance of the surface of noise walls greater than 10 feet in height, harness tie-offs for the fall protection shall be provided and shall meet the requirements of the Washington Administrative Code WAC 296-155-24510.

Where noise walls are placed less than 8’ from limited access fence line, the fence shall be attached to the ends of the noise wall. The Design-Builder shall ensure that there is at least a 10’ wide access to the area between the noise wall and fence so that no sections are landlocked.

Grading and drainage shall be done to prevent the collection of water runoff behind noise walls. Drainpipes and other structures shall not pass through noise walls or noise wall footings.

#### **2.12.4.15 Aesthetics**

The Design-Builder shall design and construct all Work in compliance with Section 2.14, and RFP Appendix L (Landscape and Aesthetic Report). Pigmented Sealer shall be applied to all exposed surfaces such as retaining walls, noise walls, barriers, caps and bridge piers. Use pigmented color tones as detailed in Appendix L.

#### **2.12.4.16 Overhead Sign Structures and Overhead Lighting**

Sign bridges, cantilever sign structures, and bridge mounted signs, and luminaires shall be designed and constructed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4th Edition, 2001, the WSDOT *LRFD Bridge Design Manual*, and WSDOT *Standard Plans for Road, Bridge, and Municipal Construction* (RFP Appendix C). New sign bridges and cantilever sign

structures shall be monotube in accordance with the WSDOT *LRFD Bridge Design Manual* standard sheets 8.2-A1 through 8.2-A14. Existing truss-style sign bridges and cantilever sign structures shall be removed and replaced by new monotube sign bridges and cantilever sign structures.

For overhead sign structures, a minimum vertical clearance of 17.5 feet shall be provided from the roadway surface to the bottom of any sign panel or its lighting fixture mounted at any possible location along the overhead sign structure.

The analysis and design of signs, luminaires, and traffic signal support structures shall conform to the following:

1. Basic wind speed of 90 mph for all areas in the State of Washington.
2. Design Life and Recurrence Interval:
  - a. 50 years for luminaire support structures exceeding 50 ft. in height and overhead sign structures.
  - b. 25 years for luminaire support structures less than 50 ft. in height and traffic signal structures.
  - c. 10 years for roadside sign structures.
3. Fatigue Design shall conform to AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4<sup>th</sup> Edition, 2001, Section 11, Table 11-1, with fatigue categories below:
  - a. Luminaire and traffic signal supports use Fatigue Category III.
  - b. High-level lighting poled in excess of 98 feet in height use Fatigue Category II.
  - c. Overhead sign structures use Fatigue Category I.

Foundations for sign bridges or cantilever sign structures shall be shaft or wall type in accordance with the WSDOT *Standard Plans for Road, Bridge, and Municipal Construction* (RFP Appendix C). Where special foundation designs are required, they shall be designed and constructed in accordance with AASHTO *Standard Specifications for Structural Supports for Highway Signs, Luminaires, and Traffic Signals*, 4th Edition, 2001. Where overhead sign structures or luminaires are mounted on bridges, the bridge structural elements shall be designed for the foundation loads from the overhead sign structures or luminaires. All sign structure and luminaire loads shall be isolated from all wall systems except for cast-in-place retaining walls.

Overhead sign structures shall conform to the material requirements specified in WSDOT *Standard Specifications* Section 9-28.14(2) (RFP Appendix B5) and Bridge Special Provisions BSP 210201011.GB8 (see RFP Appendix B.3.12). Hand holes in closed members shall have reinforcement around the holes. Structural bolted splices or connections shall use AASHTO M 164 high strength bolts. All fabricated structural components and hardware shall be galvanized after fabrication in accordance with AASHTO M 111. Hardware shall be galvanized after fabrication in accordance with AASHTO M 232.

#### **2.12.4.17 Storm Water Vaults**

Structural design of vaults must meet the criteria of the AASHTO *LRFD Bridge Design Manual* with the following exceptions:

1. Crack control and minimum reinforcing shall meet the requirements of ACI 350 *Manual of the Concrete Practices* - Volume 4 using  $z = 115$  kips/inch.
2. Seismic design loads shall be determined from the 2003 International Building Code.

#### **2.12.4.18 Submittals**

The Design-Builder shall prepare all new and revised plan sheets in accordance with the WSDOT *Plans Preparation Manual*, Section 440 through 460, and Division 5 and 6. The Design-Builder shall prepare quantity takeoffs, tabulations, and calculations in accordance with the WSDOT *Plans Preparation Manual*. Submittal tabulations, design calculations, plans, and specifications shall be shown in Customary (English) Units.

##### **2.12.4.18.1 Design Submittals**

The Design-Builder shall provide WSDOT with plans and calculations of the 30% 60%, 90% and Issued-for-Construction (100%) Work Packages. WSDOT shall review the Work Packages and provide comments on the Review Comment Form.

##### **2.12.4.18.1.1 Plans**

Structural detailing shall conform to the requirements of WSDOT *LRFD Bridge Design Manual* and WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction* (RFP Appendix B5). The Design-Builder shall prepare Design Documents on WSDOT standard sheets for the bridges, retaining walls, sign structures, lighting structures, and other minor structures. The plan set for bridges shall include construction staging.

The Engineer-of-Record shall be registered as a Structural Engineer in the state of Washington. The Engineer-of-Record's original signature, date of signature, original seal, registration number, and date of expiration shall appear on new and revised plan sheets. Plans shall be submitted on 11"x17" white bond paper. Computer aided drafting (CAD) files shall be prepared using AutoCAD or MicroStation in accordance with WSDOT *Bridge Design Manual* (RFP Appendix J).

##### **2.12.4.18.2 Shop Drawing Submittals**

The Design-Builder shall prepare shop plans for all steel bridge elements and precast elements in bridges, arches, storm water vaults, and box culverts. WSDOT personnel shall review the shop plans and provide comments on the Review Comment Form after review and approval by the Design-Builder. The following information shall be included in the shop drawings, (if applicable):

Material specifications (ASTM specifications, hardness, alloy and temper, etc.)

Sizes of members and fasteners.  
Length dimensions if shown on the Contract Plan  
Finish (surface finish, galvanizing, anodizing, painting, etc.).  
Weld size and type and welding procedures if required.  
Strand or rebar placement, jacking procedure, stress calculations, elongations, etc.  
Fabrication, reaming, drilling and assembly procedures.  
Erection procedure.

Shop Plans shall be marked Approved or Approved-As-Noted in the lower right corner. Shop Plans marked Approved-As-Noted shall clearly note the suggested correction. If abbreviations are used, mark as follows:

1. APP'D (Approved, No corrections required.)
2. AAN (Approved as noted - minor corrections only.)

#### **2.12.4.18.3 Falsework, Formwork and Temporary Structures**

The Design-Builder shall prepare design plans and calculations for falsework, formwork and temporary structures. WSDOT personnel shall review the design plans and calculations and provide comments on the Review Comment Form. Design and detailing of falsework, formwork and temporary structures shall conform to the requirements of WSDOT *LRFD Bridge Design Manual* and WSDOT *Standard Specifications for Road, Bridge, and Municipal Construction*. Plans shall be submitted on 11"x17" white bond paper. Computer aided drafting (CAD) files shall be prepared using AutoCAD or MicroStation in accordance with WSDOT *Bridge Design Manual*.

#### **2.12.4.18.4 Plan Sheet Revisions during Construction**

Calculations for revisions made during construction shall be incorporated into the design/check calculation file when construction is completed. Whenever new plan sheets are required as part of a Contract revision, the information in the title blocks of these sheets must be identical to the title blocks of the Contract they are for. Every revision will be assigned a number. The assigned number shall be located both at the location of the change on the sheet and in the revision block of the plan sheet along with an explanation of the change.

#### **2.12.4.18.5 End of Project Submittal**

##### **2.12.4.18.5.1 Plans**

The Design-Builder shall prepare As-Built Construction Documents on WSDOT standard sheets for the bridges, retaining walls, sign structures, lighting structures, and other minor structures. Plans shall be submitted on 11"x17" white bond paper and as electronic files. The Design-Builder shall submit the final approved shop drawings.

##### **2.12.4.18.5.2 Calculations**

The Design-Builder is responsible for completing all the calculations necessary for the design covered by the Work. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all calculations. The engineer-of-record shall be registered as a Structural Engineer in the state of Washington. The calculations shall include but are not limited to the following items:

1. Index Sheets - Number all calculation sheets and prepare an index by subject with the correspondence sheet numbers. List the name of the Project, SR Number, designer/checker initials, date (month, day and year) and supervisor's initials.
2. Design Calculations - These shall include design criteria, loadings, and structural analysis, one set of moment and shear diagrams and pertinent computer input and output data (reduced to 8.5 inch by 11-inch sheet size).
3. Field Changes.
4. Special Design Features - Brief narrative of major design decisions or revisions and the reason for them.
5. New Deviations not included in this RFP, and Deviations modified by Design-Builder.
6. Design Decision Summaries.
7. Design Completed Checklist form 230-035. (Appendix 1.3-A3 in the WSDOT *LRFD Bridge Design Manual*).

## **2.13 DRAINAGE**

### **2.13.1 General**

The Design-Builder shall provide a well-drained corridor and a safe environment for those that use and maintain the Project. The design and construction of all drainage structures and appurtenances shall adequately address functionality, durability, maintenance access, safety, aesthetics, and protection against vandalism. The Design-Builder shall conduct all Work necessary to meet the requirements associated with drainage, including culverts, bridge hydraulics, roadway ditches, water quality facilities, and closed storm drain systems. Unless explicitly specified in a commitment as referenced in RFP Section 2.13, the Design-Builder shall abide by the specifications and standards herein. In fulfilling the requirements for drainage, the Design-Builder shall abide by and fulfill the requirements related to the drainage features or systems of Sections 2.13.4 (Design and Construction Criteria), Section 2.8.4.2 (Permit Commitments), Section 2.8.4 (Design and Construction Criteria (Commitments)), and Section 2.13.3 (Performance Requirements). The Design-Builder shall also conduct all Work necessary to meet the requirement associated with drainage, including but not limited to:

1. Design and construction of a pavement drainage system of inlets, ditches and storm drains for both the permanent Project facilities and the temporary construction conditions for efficient removal of water from the pavement surfaces for vehicle safety. This includes cleanup and replacement of some storm-drain pipes of Lowell Hillside area, as outlined in Section 2.13.4.2.2.
2. Design and construction of permanent Project pavement area runoff water quality treatment facilities and the associated conveyance systems.
3. Maintain existing off-site flows where passing through the Project area by providing permanent new or by extending, replacing and/or protecting existing ditches, culverts, storm drains and outfalls.
4. Design and construction of temporary flow diversions during construction.
5. Maintain subsurface drainage during construction and provide passage after construction.
6. Temporary erosion and sedimentation control during construction
7. Design and conduct Work in a manner that protects existing sensitive natural resources and improves habitat conditions, especially for endangered and threatened species.
8. Prepare and implement a spill prevention plan during construction
9. Design and install permanent and disturbed area restoration plantings to increase infiltration and reduce Project area runoff.

## **2.13.2 Mandatory Standards and Reference Documents**

### **2.13.2.1 Mandatory Standards**

#### **2.13.2.1 Mandatory Standards**

**General.** Design-Builder shall design and construct the storm drainage system in accordance with the requirements of the Mandatory Standards listed in Table 2.13.1. The documents in Table 2.13.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date** Use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order

Permit requirements will take precedence over all other design and construction Mandatory Standards and Reference Documents. The list of Reference Documents is for informational purposes only and can be used to supplement the Mandatory Standards. This is not a complete list, and other applicable publications may be required to complete the drainage design elements. The Computer Programs are listed as the primary WSDOT accepted design aids. Use of other computer programs by the Design-Builder may require additional

submittal details, coordination and program conformance acceptance during WSDOT reviews.

**Table 2.13.1**  
**Mandatory Standards for Drainage**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>			Proposal
2	WSDOT	Highway Runoff Manual	M 31-16	2004	HRM
3	WSDOT	Hydraulics Manual	M 23-03	March 2004	
4	WSDOT	Design Manual For Design Build Projects	M22-02	November 2004	RFP Appendix Z
5	WSDOT	WSDOT Amendments to the Standard Specifications and General Special Provisions			RFP Appendix B4
6	WSDOT	Standard Plans for Road, Bridge, and Municipal Construction	M21-01	January 2004	RFP Appendix C
7***	WSDOT	Maintenance Manual	M51-01	September 2004	
8	WSDOT	Plans Preparation Manual	M22-31	July 2004	PPM
9	WSDOT	Construction Manual	M41-01	January 2004	
10	WSDOT	Materials Manual	M46-01	January 2004	
11	WSDOT	Utilities Manual	M 22-87	September 1998	
12	WSDOT	Environmental Procedures Manual		March 2004	
13	WSDOT	Qualified Products List	M46-02		QPL
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards. ***Document modified for design-build					

### 2.13.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.13.2 as supplementary guidelines for the design and construction of the storm drainage system. These Reference Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.13.2**  
**Reference Documents for Drainage**

No.	Author or Agency	Title	Document or Report No.	Date*	Comments, Short Forms
1	WSDOT	Stormwater Technical Report		Aug. 2004	Proposal
2	WSDOE	WSDOE, Water Quality Standards for Surface Waters of the State of Washington,	Chapter 173-201A WAC	July 2003	
3	WSDOE	Stormwater Management Manual for Western Washington, Volumes I - V, August 2000 Final Draft, Publications 91-75			
4	WSDOE	Washington State Water Quality Assessment	Section 305(b) Report	1998	
5	WSDOE	Washington State Water Quality Assessment	Section 305(b) Report Publication # 02-03-06	2002	
6	FEMA	Flood Plain Insurance Maps for Snohomish County			
7	FHWA	Design of Urban Highway Drainage		Aug. 1979	
8	FHWA	Hydraulic Design of Highway Culverts	HDS No. 5	91-85	
9	FHWA	Hydraulic Design of Improved Inlets for Culverts	HEC-13	1981	
10	FHWA	Drainage of Highway Pavements	HEC-12	1984	
11	FHWA	Urban Drainage Design Manual	HEC-22	2001	
12	FHWA	Design of Riprap Revetment	HEC-11	1989	
13	Pertect Engineering	Riverfront Stormwater Master Plan for City of Everett		Aug. 2003	
14	WSDOT	Roadside Classification Plan		1996	
15	HWA Geosciences Inc.	Brownfield's Snohomish Riverfront Stormwater Site Selection Study		Aug. 2003	
16	Brown & Caldwell	South Everett Drainage Basins Plan: Basin Plan	Report Number 3	1986	
17	Brown & Caldwell	South Everett Drainage Basins Plan: Baseline Document Snohomish River Drainage Area Basin Number 11 Lowell Bluffs		1986	
18	Brown & Caldwell	South Everett Drainage Basins Plan: Baseline Document		1986	

		Snohomish River Drainage Area Basin Number 12 Wood Creek			
19	City of Everett	Snohomish Estuary Wetlands Integration Plan	Publication #88- 17	April 1997	
20	WSDOE	Non-point Source Pollution Assessment Project		Oct. 1989	
21	USDA	Soils Survey of Snohomish County Area Washington		Nov. 1983	
22	WSDOE	Concurrence Letter, Ed Abbasi		Nov. 2003	
23	Sheldon & Associates, Inc.	Wetland Mitigation Plan, I-5 Everett HOV, SR 526 to SR 2 Vicinity		Nov. 2004	RFP Appendix W1
24	Sheldon & Associates, Inc.	Hazardous Materials Technical Report		Aug. 2004	RFP Appendix E7
25	Sheldon & Associates, Inc.	Biology Technical Report		July 2004	RFP Appendix E4

### 2.13.2.3 Data Collection

The Design-Builder shall identify all water resources issues, utilizing available data, including water quality requirements as imposed by local, State, and federal government regulations; National Wetland Inventory and other wetland/protected waters inventories (See Talent Decision Summary RFP Appendix W2); and official documents concerning the Project, such as the EA or other drainage and environmental studies. The Design-Builder shall also acquire municipal drainage plans, watershed management plans, and records of citizen concerns. Water resources issues include areas with historically inadequate drainage (flooding or citizen complaints), environmentally sensitive areas such as Lowell Hillside, localized flooding such as low point at approximately station LL 422+50 west side of the SB I-5 before entering the off-ramp, and maintenance problems associated with drainage and areas known to contain hazardous waste such as proposed location of Water Quality Site # 1. See Section 2.8.4.3.6 (Hazardous Waste Sites).

Although the Project Design Office is providing basin delineation plan in RFP Appendix H1 (Stormwater Technical Report), the Design-Builder is responsible for collecting all information necessary to design the Project drainage system.

Elements of the existing drainage system that shall remain in place shall be identified and inspected to determine whether or not the pipe has adequate strength to withstand the loads to which it will be exposed for 50 years, and whether or not the pipe will function in accordance with its intended purpose.

### 2.13.2.4 Software

The Design-Builder shall use following drainage design software:

**Table 2.13.3**  
**Drainage Design Software**

Software	Functions
MGSFlood	Continuous simulation hydrologic model Calculate runoff volume. Design water quality and detention facilities
Stormshed2G (Engenious Systems)	Storm sewer pipe design
MicroStation	Drainage plans (Drafting)
Inroads	Drainage profiles
WSDOT Spreadsheet	For pavement runoff spread calculations
HEC-RAS	U.S. Corps of Engineers water surface modeling program
HY 8	For Culvert analysis

### 2.13.2.5 Coordination with Other Agencies and Disciplines

The Design-Builder shall coordinate all water resource issues with affected interests and regulatory agencies. The Design-Builder shall document the resolutions of issues for the correspondence file, including meeting minutes and memoranda for the record. The Design-Builder shall document the permit requirements and contacts with the permitting agencies. A detailed list of coordinating agencies is provided on pages 44-45 of Stormwater Technical Report (RFP Appendix-H1)

### 2.13.2.6 Personnel Requirements

The Design-Builder shall provide a Drainage Lead Engineer with a minimum of ten years of experience in the design and construction of highway-related drainage elements. This lead engineer shall have 5 years of specific highway drainage design experience in WSDOT projects in Western Washington. This individual shall be a Professional Engineer licensed by the State of Washington and shall be responsible for the drainage design elements, including the temporary erosion and sediment control (TESC) and spill prevention control and countermeasures (SPCC) of the Project. This same engineer shall also be responsible for the design of any drainage modifications made during construction after the drainage design has been completed.

### 2.13.2.7 Warranty

Design-Builder shall warrant drainage Work in accordance with Section 2.30

### **2.13.3 Performance Requirements**

Design-Builder shall design and construct the drainage system that meets the following performance requirements:

1. Effectively and efficiently remove and treat stormwater from within the Project limits. Use Table 2.13.5, Runoff Decision Table in Section 2.13.4.2.
2. Address functionality, durability, ease of maintenance, safety, aesthetics, protection from vandalism, water quality, wetland impacts, and environmental compliance.
3. Meet water quality requirements as per WSDOT Highway Runoff Manual 2004.
4. Promote a safe environment for those who use and maintain the Project.
5. Provide construction dewatering to keep excavation free from surface and groundwater during all phases of construction.
6. Control erosion as specified in Section 2.13.4.4 and Section 2.8.3.2.3.1
7. Prepare Spill Prevention Control, and Countermeasures (SPCC) Plans and Temporary Erosion and Sediment Control (TESC) Plans as specified in Sections 2.8.3.2.3.2 and 2.8.3.2.3.1 respectively.
8. Meet water quality monitoring requirements for stormwater discharge, groundwater and construction dewatering, and hydrostatic testing discharge in accordance with Appendix 6B of the WSDOT Highway Runoff Manual.
9. Provide TESC BMP's in accordance with Appendix 6-A, Chapter 6 of the WSDOT Highway Runoff Manual.
10. Comply with required permits as outlined in Section 2.8.4.2
11. The Design-Builder shall make minimal excavation at proposed Water Quality Site No.1 due to contaminated soils in the area. See Wetland Mitigation Plans (RFP Appendix W1) for areas allowed to be excavated.
12. All stormwater quality facilities will be designed for enhanced treatment.

The Design-Builder shall provide stormwater drainage consisting of runoff collection systems, water quality treatment facilities and outfalls for the Project's new impervious pollution generating surface areas that meet the requirements of the Mandatory Standards and Reference Documents, and the appropriate Project permits. The Design-Builder shall also maintain and provide facilities for handling other on-site runoff from non-pollution generating surfaces, off-site originating flows and cross-drainage as required in the Mandatory Standards and Reference Documents. These facilities shall be sized according to the methods described in the Mandatory Standards.

The Project Stormwater Technical Report is written on a conceptual basis. The drainage design concepts shown in the report utilize a basin-by-basin, Threshold Discharge Area (TDA) approach. The Design-Builder shall design the drainage for this Project's area utilizing this same basin approach, to accommodate highway corridor runoff that discharges to, or flows through or within the Project limits. The Design-Builder shall design and provide facilities to accommodate flows as defined by Table 2.13.5, which may include such items as pipe stubs and ditch grading for connection by future or on-going adjacent Projects. The Design-Builder shall assist with the design and construction coordination of drainage for adjacent Projects that share a common TDA with this Contract as may be required by the WSDOT.

The Project permits and Right-of-Way is being processed assuming that this preliminary concept would be constructed. It is expected that the Design-Builder will utilize the Stormwater Technical Report concepts as a basis for the drainage design, refining and detailing the system as necessary to ensure the design meets all permit conditions and fulfills the environmental commitments listed in Section 2.8. The Design-Builder shall be responsible for permit or Right-of-Way modifications that may result from utilizing other concepts.

The Design-Builder shall design and construct all drainage facilities to avoid impacting environmentally sensitive areas as defined in Section 2.8 and Section 2.13.4.2.2. The Design-Builder shall also refer to Talent Decision Summary (RFP Appendix W2) and Wetland Mitigation Plan by (RFP Appendix W1). The permanent Project impacts are identified in the Project permit applications.

## **2.13.4 Design and Construction Criteria**

### **2.13.4.1 Design Criteria**

The Design-Builder shall utilize the Mandatory Standards with the Design Criteria listed below in developing the design of the Project. If any of the Design Criteria are not achievable, the Design-Builder shall submit to WSDOT clear documentation of what cannot be achieved and a proposed alternative for review. All designs shall conform to applicable Project permits.

Stormwater from I-5 impervious surfaces shall be collected, conveyed, and receive enhanced treatment at a Project stormwater facility. The conveyance system for enhanced treatment can be a completely new system or it may be a combination of new and existing systems. If existing pipes are used to convey water to a Water Quality Facility, (1) the existing pipes shall be evaluated and upgraded if necessary to meet a 50-year design life, and (2) no part of the existing system on the Lowell hillside (A, C, D, E, & G lines) shall be used. If the Design-Builder collects and co-mingles stormwater from impervious surfaces and non-impervious surfaces, that water shall be conveyed to a Water Quality Facility for enhanced treatment prior to discharge. The drainage features are described in detail in RFP Appendix H1-Stormwater Technical Report.

The Design-Builder shall design water quality facilities compatible with existing or proposed drainage systems in WSDOT Right of Way and on properties as specified in Stormwater Technical Report and shall attempt to preserve existing drainage patterns wherever possible. Where drainage patterns must be changed from the existing, the Design-Builder shall secure all permits and drainage easements. The Design-Builder shall develop a Project Drainage Overview Map, which shall serve as the base plan for final drainage design. The Overview Map shall show the existing drainage features and proposed Project drainage master plan, including drainage areas and contributing flows. The Overview Map shall also show impacts from the Project and proposed mitigation within the Map extents.

The Project is proposing six (6) water quality facilities (WQF) within the Project limits. Facilities 1 and 2 are located outside of the WSDOT Right of Way. WQF-1 at Snohomish Riverfront property and WQF-2 in the northeast corner quadrant of I-5 & 36th Street. WQF-3 is located on the Pacific Avenue off-ramp. WQF 4 & 5 are located between the ramps at the I-5/US-2 interchange within WSDOT right of way. WQF-6 is located at Marine View Drive on- and off-ramps.

#### **2.13.4.2 Treatment of Runoff**

The design of the permanent highway water quality treatment facilities shall be located outside of streams, steep slopes and wetland buffer area and designed in accordance with the WSDOT Highway Runoff Manual (M31-16) and all permit requirements unless specifically noted otherwise. The Design-Builder shall provide sufficient water quality treatment facilities (6 water quality facilities are proposed by the Design Office) to achieve the minimum contact-residence time for treating 91% of the mean annual runoff volume for flow-rate based treatment facilities, or to provide the 6-month 24-hr design storm event runoff volume, for wet pool facilities, within existing WSDOT right-of-way and offsite facilities as outlined below;

##### **Pre-treatment facility**

A Pre-treatment Facility (approved BMP from WSDOT HRM, 2004) shall be provided within the WSDOT Right of Way in the proximity of Highway Station LR 319+00 on the east side of Northbound I-5. See sheet G2 of the Stormwater Technical Report in RFP Appendix H1 for Pre-treatment Facility dimensions. All runoff from the southern project limits, which meets the criteria from Table 2.13.5, Runoff Decision Table, shall receive pre-treatment.

##### **Water Quality Facility No. 1**

All runoff conveyed to the pre-treatment facility at approximately LR 319+00 shall be conveyed through Main Street to Water Quality Facility No. 1 at the Simpson Site (Riverfront property). The conveyance system will overcross the railroad tracks in an Aqueduct/bridge structure (See Section 2.12, Bridge and Structures). The structure will also be used as a pedestrian crossing to provide public access to Water Quality Site 1 and to the Lowell River Trail.

The conveyance system shall include velocity reducers as necessary. The current Highway Runoff Manual recognizes BMP RT.13 Stormwater Treatment Wetland as an approved enhanced treatment BMP. Design-Builder shall keep the excavation at Water Quality Site No. 1(wetland impact-Boardwalk area) to a minimum due to impacts that could result

uncovering of contaminated materials at this location. Refer to Section 2.8 Environmental (Permits) and Wetland mitigation Plans for measurements of excavation.

Brownfields Riverfront Stormwater Site Selection Study Simpson Site Report, prepared by HWA GeoSciences, Inc. for the City of Everett (August 2003, contact City of Everett), and Geotechnical reports (RFP Appendices G & H4) including Hazardous Materials Technical Report (RFP Appendix E7) and WQF 1&2 Hazardous Materials Technical Report (October 2004, RFP Appendix E8) can be used to assess water table and soil characteristics at this location (Appendix M of Stormwater Technical Report). If Design-Builder elects not to use this information, the Design-Builder will provide acceptable alternate documentation.

This treatment facility will be similar to Narbeck Wetland Sanctuary at a location close to the Snohomish Riverside near Lowell-Snohomish Road (see Sheets G1 & G2, Appendix G of Stormwater Technical Report). Design this facility in a park-like setting with walking trails, ponds and natural habitat environment (see Sheets G6 to G9, Appendix G of Stormwater Technical Report). For more information visit [www.narbeck.org](http://www.narbeck.org).

Access shall be maintained to all dwellings and businesses along impacted by construction activities during the installation of the conveyance system. The Design-Builder shall be responsible for the coordination and permits required from the City of Everett and Utility Owners impacted by the Work. The Design-Builder shall bear all cost for utility relocation required to construct the conveyance system to Water Quality Site 1.

### **Water Quality Facility No. 2**

The Design Office is proposing City of Everett Property (GTS Drywall Site, Snohomish County Assessor Tax Parcel #29052900401000, WSDOT Parcel # 1-21644) north of 36th St. for construction of a storm water treatment area. The Design-Builder shall accommodate the BNSF/City of Everett proposed land exchange and shall not construct any facility to the West of the proposed turnback line as depicted in Exhibit Q. The Design-Builder shall be responsible for coordinating with the City and Railroad Company to determine the final geometry of the proposed turnback line as negotiated between the Railroad Company and the City.

The Design-Builder shall provide enhanced treatment at Water Quality Facility No. 2 at the designated location (City Property). Sand filter vaults may be used in the design of the enhanced treatment. Enhanced treatment is being provided as a result of BA, EA and discussions with WDFW. The schematic of these vaults are shown on RFP Appendix H1, page G3 of the Stormwater Technical report.

### **Water Quality Facility No. 3**

The Design-Builder shall provide enhanced treatment at Water Quality Facility No. 3 at the Pacific Avenue Off-ramp within WSDOT Right of Way. Sand filter vaults may be used in the design of the enhanced treatment. The schematic of these vaults are shown on RFP Appendix H1, page G3 of the Stormwater Technical report.

Vaults will only be accepted at these locations as other treatment BMPs are not feasible due to physical hydraulic limitations and right-of-way constraints. The sizes should be minimized by incorporating with other best management practices as much as possible. Calculations shall demonstrate that every attempt has been made to minimize the vault use and size.

**Water Quality Facility No. 4 & 5**

Existing bioswales shall be enhanced at Water Quality Facilities 4 & 5 (Onsite), see RFP Appendix H1-Stormwater Technical Report.

**Water Quality Facility No. 6**

An approved enhanced treatment BMP at Water Quality No. 6 (Marine View Drive-Onsite) shall be provided.

**Downstream Analysis**

The Design-Builder shall perform downstream analysis for individual stormwater facilities, which shall include a review of the regional (usually city or county) stormwater pipes receiving runoff, thus factoring this information into the highway runoff design. Project improvements shall not increase the potential for flooding downstream of the Project. Where downstream conveyance structures have insufficient capacity to handle the Project design criteria off-site cross-drain and/or Project area discharge flows, then alternate proposals shall be prepared to resolve the problem using alternative discharge locations or hydraulic detention routing type solutions. The Design-Builder shall advise WSDOT and provide supporting calculations prior to beginning Work on any drainage Work within that same drainage basin boundary, for any locations where improvements are required to existing downstream drainage conveyance systems outside of the limits of construction.

Use the following table to decide whether runoff should be sent to a Water Quality Facility for enhanced treatment, or conveyed east of the WSDOT Right-of-Way to the existing system without treatment.

**Table 2.13.5****RUNOFF DECISION TABLE**

<b>RUNOFF SOURCE</b>	<b>ON WSDOT ROW Inside Lowell Area (LL STA 475+00 – LL STA 510+00)</b>	<b>ON WSDOT ROW Outside Lowell Area</b>
<b>Impervious surfaces</b>	Treat**	Treat**
<b>All water co-mingled with runoff from impervious surfaces</b>	Treat**	Treat**
<b>Underdrain</b>	Treat**	Design-Builder Option (Treat** or Do Not Treat)
<b>Pass Through*</b>	Do <u>NOT</u> Treat. Do <u>NOT</u> Co-mingle. Use existing system	Do <u>NOT</u> Treat. Do <u>NOT</u> Co-mingle. Use existing system.
<b>Point sources entering WSDOT ROW that do <u>NOT</u> Pass Through</b>	Design-Builder Option (Treat** or Do Not Treat)	Design-Builder Option (Treat** or Do Not Treat)

<b>Sheet flow entering WSDOT ROW from outside of WSDOT ROW</b>	Design-Builder Option (Treat** or use existing system)	Design-Builder Option (Treat** or Do Not Treat)
<b>Water falling on WSDOT ROW <u>other</u> than on impervious surfaces.</b>	<b>West of Southbound I-5 &amp; Median</b> Treat** Do <u>NOT</u> send down Lowell hill. <b>East of Northbound I-5</b> Do send down Lowell hill.	Design-Builder Option (Treat** or Do Not Treat)
<p>* See Existing Utility Ownership Plan Sheets in Appendix U2 for definition of Pass Through. Pass Through pipes are located on sheets UT2, UT3, UT6, UT7, UT8, UT9, UT10, UT14, &amp; UT19.</p> <p>**Treat = Provide enhanced treatment, per the WSDOT <i>Highway Runoff Manual</i> (March 2004) and the Dept. of Ecology <i>Stormwater Management Manual for Western Washington</i>, 2001 edition criteria.</p>		

#### 2.13.4.2.1 Hydraulic Structures

The Design-Builder shall provide enhanced treatment at Water Quality Facilities. Sand filter vaults may be used in the design of the enhanced treatment at some locations.

It is intended that the Design-Builder utilize as much of the existing storm drainage system as possible in the 36th Street combined Basin to minimize disturbance of the existing pavement that is to remain in the pavement widening areas. For Project areas where the existing pavement is being replaced, a new drainage system will be expected. The capacity of all proposed and existing-to-remain inlets, storm drains, ditches, outfalls and other conveyance structures within the Project limits shall be sized and and/or checked for capacity and included in the calculations and Final Stormwater Report. Capacity calculations shall compare required capacity to actual capacity.

The Design-Builder shall include construction of a new drainage collection system from the south Project limit to Lowell Road and a combination of upgrades to the existing drainage system in conjunction with a new storm drainage system from Lowell Road to the northern Project limit.

#### Wall Drains

Retaining walls shall be designed to avoid stormwater flows running over the face of the wall. Typically this is be done by directing runoff away from the wall, by selected grading or by collecting the surface flows prior to such flows reaching the wall, or by installing a lined channel or ditch at the top of the wall (sealed so that surface flows do not flow down behind the wall thereby avoiding saturation of the backfill or wall underdrain system) with flows collected by inlets and storm drains to the roadway storm drain system. Design-Builder shall avoid placing surface drainage structures and pipelines in the reinforcement zone of reinforced earth and soil nail/tie back type walls, and shall otherwise align the pipes/structures to minimize conflict with the wall's reinforcement straps and anchors. Wall surface drainage facilities shall be designed to be esthetically compatible with the wall design, or otherwise located at low visibility locations. Wall surface drainage systems shall

be designed for ease of maintenance, providing low clogging, minimal maintenance type structures and/or removable clean-out covers and ports as necessary.

The internal wall drainage system (perforated pipe underdrain system) shall be connected wherever possible directly to the highway collection and conveyance system (pipes connected directly to inlets or manholes, or day lighted with appropriate erosion protection splash pad into ditches). Placement of open “weep holes” through the exposed wall face acting as underdrain outlets will not be allowed unless specifically approved in low visibility locations. Sub-drain outlet ends shall be fitted with flap type anti-rodent entry fittings. Maintenance clean-out ports shall be provided where subdrain pipes are combined with surface drainage pipes having angled fittings not inside a structure. See Retaining walls in Section 2.12.3.3.

### **Cross-Drains and Culverts**

The Design-Builder shall analyze the existing and proposed culverts and drainage-ways impacted, replaced, and created by the Design Documents, for any potential to create localized flooding problems. The Design-Builder shall design culvert replacements and improvements to meet the requirements of the WSDOT Highway Runoff Manual (March 2004). The Design-Builder, for major culverts, shall complete design computations and risk assessments. Where culvert or bridge design is influenced by upstream storage, the flood-routing computations shall be included with the culvert or bridge analysis. Culvert design shall meet the requirements of the Hydraulics Manual.

In pavement widening areas, where most of the existing pavement is to remain, the existing cross-drains and culverts shall be maintained and extended where necessary to match revised roadway sections, unless the condition of the facility requires replacement. In areas where the pavement section is to be replaced or constructed, new cross-drains and culverts shall be constructed.

Cross-culverts operated and maintained for the benefit of others (i.e. city and county storm drain systems) shall be protected and maintained at their existing capacity and function.

All existing and proposed cross-drains and culverts in the Project area shall be sized and/or checked for capacity and results included in the design calculations and Final Stormwater Report. Capacity calculations shall compare required capacity to actual capacity. Existing cross-culverts that convey water from the City of Everett system from west of the WSDOT Right-of-Way do not require evaluation for capacity unless the Design-Builder introduces additional water into those pipes.

All existing and proposed cross-drains and culverts in the Project area shall be sized and/or checked for capacity and results included in the design calculations and Final Stormwater Report. These conveyance line crossings are also shown on Existing Utility Ownership Plans in RFP Appendix U2.

Culvert ends within the clear zone shall be beveled, with safety bars, subject to further reinforcement protection as required in the WSDOT Hydraulics Manual and requirements noted on the applicable WSDOT Standard Plans for Road, Bridge and Municipal Construction.

For structural plate culverts, the Design-Builder shall use the standard structural plate culvert interior, headwall, and end sections included in the WSDOT Standard Plans for Road, Bridge, and Municipal Construction. The Design-Builder shall not use corrugated steel structures with a span greater than 26 feet. The Design-Builder may use pre-cast or cast-in-place concrete interior, headwall, and end sections in accordance with the requirements stated in the WSDOT Bridge Design Manual (RFP Appendix J). Pre-cast arch segments and wingwall sections shall be supported on spread footings, drilled shafts, or piling. Timber piles shall not be used as foundations for culverts or pre-cast concrete arches.

### **Runoff Treatment Vaults**

Sand filter vaults shall be designed for Water Quality Facilities No. 2 & 3. Given the hydraulic limitations, enhanced treatment BMPs and Right of Way constraints at some locations, Design-Builder shall employ best management practices to minimize vault sizes to the extent possible. Enclosed vaults and galleries shall be designed for ease of maintenance access, with paved access and Work areas outside of the highway traffic and shoulder area. The vaults shall be equipped with necessary hydraulic controls for ease of dewatering. Bypass piping and control valves shall be incorporated to route flows around the structure during cleaning operations. The vaults shall have the floor sloped to the access end. The smallest possible vaults shall be designed and constructed suitable for cleaning with high-pressure rodding and vacuum trucks. The vaults shall include a sump in the lower elevation end, under an access cover to assist with the pump out. Large vaults shall have ramp access suitable for motorized sediment removal equipment (i.e. small front-end loaders such as bobcats or skid steers). Secondary access shall be also provided suitable for easy personnel entry during inspections.

Vaults shall have paved site access and staging area suitable for the necessary cleaning operations and loading of dump trucks. The vaults shall be vented and have locking covers, or be otherwise fenced to protect against unauthorized entry. See Section 2.12.4.17 for additional vault structural requirements.

### **Bridges and Cross Drains**

**Coordination** Coordinate all crossings located in FEMA-regulated floodplains with the City of Everett.

#### **Design**

Provide end sections or head walls for cross drains. Perform hydraulic calculations for cross drains in accordance with WSDOT Hydraulics Manual (M23-03). Show tailwater and headwater elevations on the computation sheets. Provide chamfer for all cross drains operating under inlet control at the design flow per WSDOT Standards. Limit the allowable headwater by the minimum elevation of the following:

1. Non damaging to upstream property
2. 18 inches below the edge of the shoulder
3.  $HW/D < 1.25$  ft
4. Low point in the road grade
5. Elevation where flow diverts around the culvert.

#### **2.13.4.2.2 Lowell Hillside**

Lowell Hillside area on the northbound, east side of Mainline I-5 along the shoulder between 190.60 to MP 190.90 had problems of embankment settlement due to voids in the fill below the pavement. See RFP Appendix H4 (Geotechnical Report) for details. Due to past issues and hazards to the Northbound I-5, a Technical Memorandum was submitted earlier, outlining issues and remedies. See RFP Appendix H5. A recent video inspection data and Project recommendation report is also attached as RFP Appendix H6.

The Project Design Office has provided the Design-Builder with data of existing pipe systems, including summaries of the inventory survey, pipe types, general condition of pipe and structures for each system, with photo and plan exhibits that illustrate the general condition and specific problems of each pipe run. The report (RFP Appendix H5) identifies specific failures and blockages and suggested repair methods for all four trunk lines.

The Design-Builder shall provide fixes to the existing drainage system, per recommendations of the Project Design Office as outlined in Lowell Recommendation Report (RFP Appendix H5).

The Design-Builder shall also perform the following while working in Lowell vicinity:

1. Pipe routing from MP 190.60 to 190.90 shall be done on the west side of the NB I-5.
2. Due to steep slopes and sensitive area, no heavy machinery will be placed on the Lowell Hillside slopes.
3. Inclinometers shall be placed for long-term observation of any earth movement in the area.
4. Before commencement of any Work, the Design-Builder will provide its own recommendations for approval, on the basis of engineering judgment and available data.
5. The Design-Builder will also submit an exclusive report with plans after performing this Work. This report will include observations and recommendations of the Design-Builder to further improve the stability of this area.
6. Any major Work other than mainline drainage in the Lowell Hillside vicinity requires prior approval from the Department.
7. All Work shall be performed in accordance with WSDOT Highway Runoff Manual Chapter 6 (Temporary erosion and sediment control Design Guidance and Process), Section 1-07.15 and Division 8, WAC 173-201 A and the Project permits.

#### **2.13.4.2.3 Bridge Deck Drainage**

Where design calculations reveal that spread limits will be exceeded during the design storm, Design-Builder shall include a bridge deck drainage system in the Design Documents that is compatible with the structural reinforcement, components, and aesthetics of the bridge.

Where bridge deck drainage is required, existing bridge drains in the bridge decks shall be replaced by grate inlets off the ends of the bridge wherever possible. Existing bridge drains

shall be plugged and existing drainpipes from the basins shall be removed. Refer to Section 2.12.4.7 (Bridge Drainage).

#### **2.13.4.2.4 Outfalls and Downspouts**

Design-Builder shall position outfalls to avoid corrosion of structural members, erosion of embankments, and splash on moving traffic and sidewalk areas below the bridge. Design-Builder shall install downspout discharge not greater than 4 feet above the finish grade of surface; use galvanized steel pipe with a minimum diameter of 8 inches and a minimum wall thickness of  $\frac{1}{8}$  inch, and provide maintenance access at every 250 feet for downspout systems.

#### **2.13.4.2.5 Bridge Approach Drains**

Design-Builder shall intercept pavement drainage at both ends of bridges. For stormwater flowing toward the bridge, the interception shall occur before the approach slab; for stormwater leaving a bridge, the interception shall occur before it leaves the approach slab. Refer to Bridge Plans showing inlet locations.

#### **2.13.4.2.6 Storm Drain Systems**

##### **2.13.4.2.6.1 General**

The storm drain system will consist of gutters, inlets, ditches, pipe and other appropriate fixtures designed to convey storm runoff to the receiving waters

##### **2.13.4.2.6.2 Design**

Stormshed software shall be used for rainfall intensity and calculation of runoff rates and to size the pipes. Design-Builder shall do not decrease the storm drain size in the downstream direction, nor allow sump or inverted siphon conditions. The storm drain system shall include:

1. Drainage area maps for each storm drain structure with pertinent data, such as boundaries of the drainage area, topographic contours, etc.
2. Location and tabulation of all existing and proposed pipe and drainage structures. These include size, class or gauge, catch basin spacing, detailed structure designs, and any special designs.
3. Specifications for the pipe bedding material on all proposed pipes and pipe alternates as required in the WSDOT Specifications for Construction and WSDOT Geotechnical Manual.
4. Complete pipe profiles, including pipe size, type and gradient; station offsets from the centerline of the roadway; length of pipe; class/gauge of pipe; and numbered drainage structures with coordinate location and elevations.
5. Gasketed, reinforced concrete pipe with tied joints shall be used anywhere that significant traffic disruption will result from replacement of storm drainpipe and cross-culverts. Pipes with flow velocities less than 3 fps shall be designed for full flow at 80% of the internal diameter to account for sedimentation in the pipe. Other storm drainpipes shall be designed using the full internal diameter.

6. Rubber gasketed joints are required for all drain pipe installations as per Section 7-04.3(2) E and Section 9-05 of the WSDOT Standard Specifications

#### **2.13.4.2.6.3 Inlets and Catch Basins**

Inlets and Catch basins will comply with WSDOT Standard Plans (M21-01). Design-Builder may at its option, use pre-cast catch basins. Design-Builder shall use 300 feet maximum catch basin spacing for storm drainpipes lesser than 48" diameter. It is the responsibility of the Design-Builder to coordinate with WSDOT Maintenance Office for more specifics on spacing between catch basins.

#### **2.13.4.2.6.4 Connections to Existing Systems**

Design-Builder shall develop plans and specifications for connections to existing WSDOT storm drainage systems. Before making connections, Design-Builder shall obtain design approval as required from the Department. Design-Builder shall show the design flow on the hydraulic plan sheets at the location of entry to the system.

#### **2.13.4.2.6.5 Planned Future Systems**

Design-Builder shall develop plans and specifications for providing stubs beyond the edge of the ROW for planned future storm drain connections and shall, coordinate the locations of these connections with the stakeholder agencies. Design-Builder shall show the design flow on the hydraulic plan sheets at the location of entry to the system.

#### **2.13.4.2.6.6 Pipes and Culverts**

##### **Design Life**

For new pipes and culverts, Design-Builder shall use a design life of 50 years. Existing pipes or culverts that are to remain a part of the I-5 corridor drainage systems shall be relined (slip lined) to provide a 50-year design life.

##### **Existing Pipes and Culverts**

Design-Builder shall evaluate and replace or reline (slip lining) all existing drainage pipes and culverts under the proposed roadway and ramps. If an existing pipe is to be relined (slip lined), Design-Builder shall maintain at least the same hydraulic capacity in the resulting facility as that of the existing structure. Design-Builder shall evaluate the structural integrity of any existing pipe that will remain to verify that any change in fill or loading placed on the pipe will not exceed design recommendations. Design-Builder shall not reuse or allow any existing drainage pipe or culvert to remain that does not meet this criterion, whether or not its modification to the pipe or culvert is required for Project drainage.

**Locating Facilities** Design-Builder shall locate existing facilities as required in Section 2.10 (Utilities and Third Party Agreements), and shall identify conduit, pipe, and structure materials.

##### **Hydrologic Data**

Refer to Stormwater Technical Report (RFP Appendix H-1) for basic hydrologic data and preliminary drainage basin delineation. (This information is provided as a basis of bid only, and is subject to the final evaluation and engineering of the Design-Builder.)

**Floodplains**

The I-5 Everett HOV Project Site is not located within a FEMA-mapped flood plain. However, proposed Water Quality Facility Sites 1 & 2 near the Snohomish River are within the FEMA 100-year floodplain (see Appendix L of Stormwater Technical Report (RFP Appendix H1)). The proposed Water Quality Sites are located in an Urban Flood Fringe District, and could be fully developed with no floodplain mitigation (FEMA allows up to 1' of rise). WQF-1 lies within 200 feet of the Ordinary High Water Mark, therefore a Shoreline Substantial Development permit must be obtained.

Currently, the Snohomish River Estuary located near the Snohomish River is within the 100-year floodplain and is comprised primarily of inter tidal wetlands that over time have been converted to agriculture and residential uses.

**Sag Locations**

Design-Builder shall provide catch basins at each low point on each sag vertical curve to prevent ponding.

**Inlets**

Design-Builder shall use grate inlets on the mainline, ramps and collector-distributors combination curb-and-grate for all other inlets.

**2.13.4.3 Wells and springs**

See RFP Appendix H1, pages 18-19

**2.13.4.4 Temporary Erosion and Sediment/Pollution Control**

Temporary erosion and sediment control (TESC) and spill prevention control and countermeasures plans (SPCC) and narratives shall be prepared and implemented in accordance with the Section 2.8, WSDOT Highway Runoff Manual Chapter 6, WSDOT Standard Specifications, Section 1-07.15 and Division 8, WAC 173-201 A and the Project Permits. Runoff from construction areas shall be collected and treated and/or discharged consistent with the WSDOT Highway Runoff Manual.

The TESC plans and narrative shall be prepared under the direction of, and signed by a Drainage Design Lead Engineer, a Professional Engineer licensed in the State of Washington.

The Design-Builder's TESC and SPCC plans shall be stamped by the Licensed Engineer as outlined above. Copy of such plans will be submitted to WSDOT for information only. No construction Work shall be performed prior to the Design-Builder having submitted stamped TESC and SPCC plans in strict guidance of applicable codes and standards.

Failure of the Design-Builder to comply with the Mandatory Standards and Permits for TESC and SPCC can result in extensive damage to the natural resources of the State, with long term negative effects on wildlife, habitat and public use. Non-compliance will also cost taxpayers undue sums of money, adding costs needed for administration, analysis, engineering, inspection, and supervision. The Design-Builder will be responsible for any fines incurred as a result of violations.

#### **2.13.4.5 Drainage Outfalls**

##### **Existing Outfalls**

Runoff from the proposed water quality facilities will be discharged to the Snohomish River through existing outfalls at various locations in the Project vicinity. See page 25-26 of the Stormwater Technical Report for details. Only the 18” outfall at Water Quality Facility No. 1 will be replaced with a larger sized pipe.

##### **New Outfall at Snohomish Riverfront Property**

Design-Builder shall avoid riparian habitat disturbances as much as possible during the design and construction of the new drainage outfall at Riverfront property (WQ1). Design-Builder shall situate the new outfall so that the outlet elevation is as close to the existing grade as possible, and shall avoid high outlet elevations that will necessitate the use of excessive amounts of riprap. See Section 2.8 (Permits) for dimensions and other details. The size of the existing Outfall is not adequate to handle the proposed runoff. Culvert analysis shows that a 54-inch CMP culvert is needed to handle the proposed runoff. The existing 18” outfall shall be replaced by a 54-inch diameter CMP culvert at 1/2 % slope. The designed culvert will have the capacity of handling over 85 cfs (See Stormwater Technical Report, Outfalls). A permit requirement may be that a fish screen be installed at the outfall to restrict fish flow into the outfall. The Design-Builder shall determine flows, volumes, areas and functionality in order to verify whether it will be necessary to provide flap gate at this outfall to address high stormwater flow during a high-river stage case scenario.

#### **2.13.4.6 Construction Schedule**

Design-Builder shall provide the Department a schedule for storm drain outfall construction as part of the Contract Schedule updates. This schedule shall include estimated dates for connecting to other municipalities’ storm drains and new outfall construction.

##### **Construction Hours**

Construction across the dike to lay the conveyance pipe under the City’s bike path is not allowed during park operating hours.

#### **2.13.4.7 Quality**

Provide quality inspection, testing, and acceptance in accordance with Section 2.26 –Quality.

### **2.13.5 Submittals**

#### **2.13.5.1 Proposal Submittals**

The Design-Builder shall demonstrate its understanding of the permit requirements for (TESC) by submitting a set of basic plans and a general description of the intended runoff

treatment procedures for construction area runoff for each stage of the Design-Builder's proposed staging plan, included in the Design-Builder's Proposal submittal (See Instructions to Proposers RFP Appendix AA and Section 2.8).

#### **2.13.5.1.1 Initial Design Submittals**

The Design-Builder shall prepare quantity takeoffs, tabulations, and backup calculations to support items requiring a statistical acceptance/performance basis as required by the Design-Build Quality Management Plan.

Prior to starting construction on the drainage system, the Design-Builder shall inventory, use existing survey data and inspect all existing drainage pipe systems and associated structures that are to remain in the Project area, including storm drains, cross-drains and culverts. The survey shall identify each system by highway milepost and Project stationing and offsets from alignments, and show the pipe end and structure coordinates, sizes, structure types, invert levels at ends and structures, skews and upstream and downstream channel profile and cross sections within the construction limits. The channel cross-sections shall be taken at no longer than 50' spacing, to include the cross-section at the culvert end and at edge of construction limit. The Design-Builder shall submit the Drainage Existing Condition Report, along with copies of the inspection videos and electronic format survey data, as part of the Stormwater Report 100% submittal.

#### **2.13.5.1.2 Plans**

The Design-Builder shall prepare drainage plan sheets in accordance with the Plans Preparation Manual, Section 440 through 460, and Division 5 and 6. The Design-Builder shall prepare Design Documents on WSDOT standard sheets for the drainage. Plans shall be submitted on 11" x 17" white bond paper and in electronic format on a CD-ROM. Plans shall be submitted at 30%, 60%, 90% and 100% stages for review.

#### **2.13.5.1.3 Calculations**

The Design-Builder shall prepare drainage calculations in accordance with the WSDOT Hydraulics and Highway Runoff Manuals to accompany and support each drainage plan review submittal. The calculations shall be in a white paper type summary format with narrative that describes the approach and order of the calculations including sections on the methodologies used (include appropriateness and accuracy requirements), design decisions made and resultant summaries. The calculations shall have copies of the supporting computer programs input and output printouts, spreadsheets, hand calculations, exhibits and sketches attached.

The calculations shall include any draft Project special provisions required for construction.

### **2.13.5.2 Final Design Submittal**

The final design submittal for drainage shall be made after all drainage design packages have been reviewed and all comments resolved. This submittal shall represent the final plans and specifications that were used in the construction.

#### **2.13.5.2.1 Plans**

Prepare plan and detail sheets in accordance with the Plans Preparation Manual, Section 440 through 460, and Division 5 and 6. The Design-Builder shall prepare Design Documents on WSDOT standard sheets for the drainage construction. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the all plan and detail sheets. The Engineer-of-Record shall be registered as a civil engineer in the state of Washington. Plans shall be submitted on 11" x 17" white bond paper and in electronic format on a CD-ROM.

#### **2.13.5.2.2 Calculations**

A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all calculations.

The Design-Builder is responsible for completing all the calculation necessary for the design covered by the Scope of Work. The Design-Builder shall prepare calculations in accordance with the Plans Preparation Manual, the Hydraulics Manual and the Highway Runoff Manual to support the design shown in the Design Documents. The Engineer-of-Record shall be registered as a civil engineer in the state of Washington. The calculations shall be in a white paper type summary format with narrative that describes the approach and order of the calculations including sections on the methodologies used (include appropriateness and accuracy requirements), design decisions made and resultant summaries. The calculations shall have copies of the supporting computer programs input and output printouts, spreadsheets, hand calculations, exhibits and sketches attached. The calculations shall include but are not limited to the following items:

1. Index Sheets - Number all calculation sheets and prepare an index by subject with the correspondence sheet numbers. List the name and number of the Project, SR Number, designer/checker initials, date (month, day and year), and supervisor's initials.
2. Design Calculations - These shall include design criteria, hydrology and hydraulics calculations and pertinent computer input and output data (reduced to 8.5 inch by 11-inch sheet size). The calculations shall include a narrative of approach taken, final conclusions and summaries of the calculation results in both narrative and table format. The calculations shall be in logical order, technically clear, and cross-referenced to correspond directly with drainage structure and basin numbering on the drainage plans, maps and exhibits for ease of reference.
3. Special Design Features - Brief narrative of major design decisions or revisions and the reason for them.
4. Special Design Features - Brief narrative of major design decisions or revisions and the reason for them.
5. New Deviations not included in this RFP, and Deviations modified by Design-Builder.
6. Design Decision Summaries.
7. Drainage maps showing the hydrologic features, drainage basins, sub basins, threshold discharge areas, existing and final conveyance and cross-drain structures, flow direction arrows and any other features necessary to support and clarify the design calculations. The drainage maps shall also show all geotechnical and environmental sensitive areas, streams and wetlands with buffer boundaries, riparian zones, the ordinary high water and FEMA flood level contours, aquifer and well head

- protection zones, sanitary drain fields and major utilities that will effect the drainage design. The drainage maps shall be on 11" x 17" bond paper.
8. Other exhibits as necessary to provide details necessary to clarify and support the calculations

### **2.13.5.2.3 Stormwater Report**

The Design-Builder shall prepare a Stormwater Report in accordance with the WSDOT Hydraulics Manual and the Highway Runoff Manual. The Stormwater Report shall follow the same general outline and format as shown on the Stormwater report template. A hard copy is attached as RFP Appendix H2; the template is also available online at <http://wwwi.wsdot.wa.gov/regions/northwest/RP&S/Environmental/HWQ/default.htm>. The Stormwater Report shall be submitted in an 8.5" x 11" format except that exhibits may be 11" x 17". The report shall be submitted bound on bond paper and in electronic format on a CD-ROM.

The Stormwater Report shall be updated by the Design-Builder to reflect changes in the original design during construction. Updating shall be done by the Design-Builder providing supplemental attachments to the Stormwater Report. The supplements should reference the original Stormwater Report and be specific as to the changes, but be easily readable as a stand-alone type document as to why the revision was made, how it effected the design and include the revised drawings and exhibits, supporting calculations, and revised summaries and tables. The supplements shall be submitted as part of the drainage design revision reviews and approval process for major modifications, and as a record of as-built changes for minor changes grouped together as convenient, but at frequency not to exceed five revisions at any one time. The combined Stormwater Report and supplemental updates should reflect the design and as-built condition of the drainage system at the end of construction.

A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the Stormwater Report and all supplemental attachments. The Engineer-of-Record shall be registered as a civil engineer in the State of Washington.

### **2.13.5.3 Specifications**

The Design-Builder is responsible for completing all specifications necessary for the construction of design elements covered by the Scope of Work. The Design-Builder shall prepare Project construction specifications (special provisions) for all items of construction that are not otherwise covered by the Mandatory Standards, or as needed to clarify specific items of Work. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the cover of all Project construction specifications. The Engineer-of-Record shall be registered as a Professional Civil Engineer in the State of Washington.

### **2.13.5.4 Shop Drawing Submittals**

The Design-Builder shall submit approved shop plans for all drainage structure and pipe elements. The following information shall be included in the shop drawings, (if applicable):

- Material specifications (ASTM specifications, class, type, coatings, etc.)

- Copies of manufacturer's literature, including manufactures installation, handling and maintenance recommendations.
- Sizes.
- Pipe bedding and jointing methods. Pipe loading and stress calculations. Drain and culvert camber calculations with final bedding profiles. Any pipe jacking/boring installations will require specific pipe material and installation methodology submittals to be prepared in full detail along with the necessary geotechnical investigations/recommendations.
- Structure types (pre-cast or cast-in-place).
- Structure forming and rebar details, along with supporting calculations.
- Complete material submittals for approval if material is not on the approved material list
- Installation procedure.
- Shop Plans shall be marked with of two categories in lower right corner. Shop Plans marked Approved-As-Noted should clearly note the suggested correction.
- APP'D (Approved, No Corrections required.)
- AAN (Approved as noted- minor corrections only. Do not place written questions on an approved as noted sheet.)

#### **2.13.5.5 Project Submittals during Construction**

Construction Problems or Revisions (As They Develop) - Calculations for revisions made during construction shall be incorporated into the design/check calculation file when construction is completed.

Whenever new Design Documents are required as part of a Contract revision, the information in the title blocks of these sheets shall be identical to the title blocks of the relevant plan sheet being replace.

Every revision will be assigned a number, which shall be enclosed inside a triangle. The assigned number shall be located both at the location of the change on the sheet and in the revision block of the plan sheet along with an explanation of the change.

The Design-Builder shall prepare all new and revised plan sheets in accordance with the Plans Preparation Manual, Section 440 through 460, and Division 5 and 6. A Professional Engineer's original signature, date of signature, original seal, registration number, and date of expiration shall appear on the all-new and revised plan sheets. The Engineer-of-Record shall be registered as a civil engineer in the state of Washington. Plans shall be submitted on 11"x17" white bond paper and in electronic format on a CDROM.

Any proposed design changes requiring permit modifications or additional regulatory/resource agency approvals shall first be submitted for review by WSDOT, who will work with the Design-Builder and the appropriate regulatory/resource agencies approval of the design change requiring a permit modification or additional approvals.

### **2.13.5.6 Maintenance Manual**

The Design-Builder shall prepare a drainage maintenance manual that describes the “what” and “when” maintenance procedures for all drainage facilities, including the maintenance requirements for the runoff water quality treatment facilities. The maintenance manual shall be complete with a description of the best management practices used on the Project, how they function and what areas contribute to them. The maintenance manual shall be prepared in an 8.5” by 11” bond paper format, bound, except that exhibits may be on 11” by 17” sized paper. The Design-Builder shall submit a final version of the manual consisting of five (5) bound copies of the Drainage Maintenance Manual. The final submittal shall include an electronic version in PDF format on a CD-ROM.

### **2.13.5.7 As-Built Plans**

Upon Physical Completion of the Project, the Design-Builder shall deliver to WSDOT a complete set of As-Built Plans and design files that incorporate all design changes and details of the Work.

## **2.14 ROADSIDE RESTORATION AND AESTHETICS**

### **2.14.1 General**

#### **2.14.1.1 General Scope**

Design, provide, install, construct and establish/maintain the landscape and aesthetics improvements in accordance with the requirements of this Section and RFP Appendix L, including Reference Documents, performance requirements, design and construction criteria, and submittals. All areas that are considered to be permanent construction must meet the requirements of this Section and RFP Appendix L.

#### **2.14.1.2 Definition**

Roadside Restoration adds vegetation to disturbed areas, provides and/or enhances roadside functions, integrates the Project into adjacent communities, and blends the Project into the overall I-5 corridor character (See Roadside Classification Plan). Roadside Restoration elements include grading, amending soils, trees, shrubs, groundcovers, turf, grass seeding, mulch, rock, topsoil, irrigation system, and other elements identified during Community Involvement meetings.

Aesthetic treatments are design details that provide a coordinated visual appearance for the Project and blend the Project into the overall highway corridor. These details dictate the form, color, and texture of structural, civil and traffic components including bridges, noise walls, retaining walls, pavement, raised features, traffic barriers, and hardware for utilities and traffic control devices.

### **2.14.1.3 Roadside Restoration and Aesthetic Treatment Master Plan**

The Department and the City of Everett desires to preserve the existing trees inside the Right of Way.

The Design-Builder shall not remove or damage any trees except those that are physically in conflict with permanent Project roadway or structure features.

Design-Builder shall prepare a proposed Roadside Restoration / Aesthetic Treatment Draft Master Plan based on the criteria in this Section. The proposal shall address the integration of the Aesthetic Treatments throughout the Project based on the criteria in RFP Appendix L. The Draft Plan will be used to gain preliminary input and for Community meetings for the Project.

Design-Builder shall develop a revised Final Master Plan that incorporates input from the WSDOT Aesthetic Review Team and Advisory Committee Subcommittee(s). The final plan shall show a more refined concept for the treatment of areas to be included in the roadside restoration, wetland mitigation, and aesthetic treatment of visual elements.

Design-Builder shall provide and construct roadside restoration and aesthetic treatments that:

1. Respond to the recommendations of the Aesthetic Review Team and the advisory committee(s) in coordination with the Roadside Restoration Final Master Plan;
2. Provide a unified appearance through the highway corridor and a connection to communities in the community enhancement areas;
3. Are aesthetically pleasing and fit the neighboring environment.

### **2.14.1.4 WSDOT Aesthetic Review Team**

The Master Plan for the Roadside Restoration and the Aesthetic Treatment, application of the Landscape and Aesthetics Report (RFP Appendix L) and the development of unique features for the city entrance areas, city and community corridors, and neighborhood enhancement areas shall be reviewed and approved by the WSDOT Aesthetic Review Team.

### **2.14.1.5 Advisory Committee Subcommittee(s)**

Design-Builder shall coordinate the development of the roadside restoration master plan and aesthetic treatments plan, and the development of city entrance areas, city and community corridors, and neighborhood enhancement areas with the appropriate subcommittees as outlined herein and in Section 2.9 (Public Information And Community Involvement Plan).

### **2.14.1.6 Early Aesthetics Review**

Aesthetic design considerations directly influence other Project components, such as the pier configuration on bridges. Early coordination and concurrence with the WSDOT Aesthetic

Review Team and subsequently with subcommittees (Section 2.9) on treatment concepts is crucial so that the aesthetic treatment may be incorporated into the structural design.

### 2.14.1.7 Maintenance During Construction

Design-Builder shall establish the Roadside Restoration elements and maintain aesthetic treatments during construction in accordance with the requirements in Section 2.27 (Maintenance During Construction).

## 2.14.2 Mandatory Standards and Reference Documents

### 2.14.2.1 Mandatory Standards

**General.** Design-Builder shall design, provide, install, and construct the landscape and aesthetic improvements in accordance with the requirements of the Mandatory Standards listed in Table 2.14.1. The documents in Table 2.14.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, adhere to the standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than any of the listed Mandatory Standards, Design-Builder shall adhere to the standards identified in the Proposal.

**Ambiguity.** If there is any unresolved ambiguity in Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.14.1**

**Mandatory Standards for Landscape and Aesthetic Improvements**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Design-Build Project</i>	N/a		Proposal
2	WSDOT	Roadside Classification Plan	M25-31	1996	
3	WSDOT	Design Manual For Design Build Projects	M22-02		RFP Appendix Z
4	WSDOT	<i>Roadside Manual</i>	M25-30	2003	
5	AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS-3	2001	"Green Book"
6	WSDOT	<i>Standard Plans</i>	N/a		RFP Appendix C
7	Amer. Assoc. of Nursery-men	<i>American Standard for Nursery Stock</i>	ANSI Z60.1		n/a
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					

### 2.14.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.14.2 as supplementary guidelines for the design, provision, installation, and construction of the landscape and aesthetic improvements. These documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.14.2**  
**Reference Documents for Landscape and Improvements**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	<i>A Guide for Transportation Landscape and Environmental Design</i>	S99-HLED-2	1991	n/a
FHWA	Flexibility In Highway Design	FHWA-PD-97-062		
WSDOT	DRAFT Understanding Flexibility in Highway Design			
WSDOT	<i>Highway Runoff Manual</i>	M31-16	2004	n/a
Cornell University L.H. Bailey Hortorium	<i>Hortus Third, A Concise Dictionary of Plants Cultivated in the United States and Canada</i>	MacMillan Publishing Co., NY		n/a

### 2.14.3 Performance Requirements

The Department and the City of Everett desires to preserve the existing matured trees in the along the roadway.

The Design-Builder shall not remove or damage any trees except those that are physically in conflict with permanent Project roadway or structure features.

Design-Builder shall prepare a proposed Roadside Restoration / Aesthetic Treatment Draft Master Plan based on the criteria in this Section. The proposal shall address the integration of the Aesthetic Treatments throughout the Project based on the criteria in RFP Appendix L. The Draft Plan will be used to gain preliminary input and for Community meetings for the Project.

Design-Builder shall develop a revised Final Master Plan that incorporates input from the WSDOT Aesthetic Review Team and Advisory Committee Subcommittee(s). The final plan shall show a more refined concept for the treatment of areas to be included in the roadside restoration, wetland mitigation, and aesthetic treatment of visual elements.

Design-Builder shall provide and construct roadside restoration and aesthetic treatments that:

4. Respond to the recommendations of the Aesthetic Review Team and the advisory committee(s) in coordination with the Roadside Restoration Final Master Plan;
5. Provide a unified appearance through the highway corridor and a connection to communities in the community enhancement areas;
6. Are aesthetically pleasing and fit the neighboring environment.

The Design-Builder shall implement the conceptual surface finishes provided in Appendix M7A, Aesthetic Surface Finishes and Patterns, in conjunction with the guidelines provided in Appendix L, Landscape and Aesthetics Report and this section of the RFP at the following locations:

A. At the beginning and end of noise walls, for a distance on both ends of the wall of 200' or 10% of the wall length unless otherwise noted. This treatment shall be on the side of the noise wall that faces I-5.

B. The full length of the following noise walls on the side of the noise wall that faces I-5:

- a. Noise Wall NW3
- b. Noise Wall NW3B
- c. Noise Wall NW4
- d. Noise Wall NW5
- e. Noise Wall NW6
- f. Noise Wall NW7

C. The full length and on both sides of the following walls:

- a. Noise Wall 7 and component retaining wall, if any. The pattern and finish applied on the side of the noise wall facing Summit Park requires the concurrence of the Everett Parks Department.

D. At abutments and wall components of the following existing and new bridges:

- a. Bridge 5/628W, Southbound Mainline I-5
- b. Bridge 5/628N-N, Northbound Broadway general-purpose off-ramp
- c. Bridge 5/635E & W, Pacific Avenue
- d. Bridge 5/636E & W, Hewitt Avenue
- e. Bridge 5/640E & W, Everett Avenue
- f. Bridge 5/642, 23<sup>rd</sup> Avenue

E. At retaining walls visible to the traveling public, for the full length of the wall.

The determination of which of the patterns and finishes provided in Appendix M7A, Aesthetic Surface Finishes and Patterns, to be used at the locations listed above shall be proposed by the Design-Builder and subject to approval by WSDOT. All 3 pattern style group are expected to be used.

## **2.14.4 Design and Construction Criteria**

### **2.14.4.1 WSDOT Aesthetic Review Team**

The development and application of Roadside Restoration and Aesthetic Treatments shall be reviewed and approved by the WSDOT Aesthetic Review Team.

### **2.14.4.2 Advisory Committee Subcommittee(s)**

Design-Builder shall form one or more committees from the Community Involvement noted in Section 2.9 (Public Information And Community Involvement Plan) as required to identify, propose, and evaluate landscape and aesthetic improvements for city entrance areas, city and community corridors, and neighborhood enhancement areas within the Project. Design-Builder shall facilitate the subcommittee meetings and assist the subcommittee(s) in developing a program that meets the requirements of the Project, including budget. Where appropriate, Design-Builder shall establish partnerships for funding and develop maintenance agreements for unique design features in community enhancement areas. This applies to elements that exceed WSDOT established standards. Design-Builder shall incorporate the recommendations into the Roadside Restoration Master plan and the Aesthetic Treatment Plan.

### **2.14.4.3 Roadside Restoration**

#### **General**

The Project shall be broken into the following 5 geographic Roadside Treatment areas:

**1. I-5 Corridor**, as shown on sheet 1 of 9, titled “corridor continuity and enhancement opportunity analysis” in Appendix M7. The Design-Builder shall, to the greatest extent possible, achieve preservation of desirable existing vegetation. Areas disturbed by the Design-Builder due to construction activities (including but not limited to areas such as cut slopes, fill slopes, staging areas, haul roads, areas above and at the toe of retaining and noise walls, etc.) shall be restored to “Roadside Classification Plan Treatment Level 2”. For these areas disturbed by the Design-Builder due to construction activities, Design-Builder shall include in the Proposal Price and perform landscaping valued at a minimum of \$1,200,000 excluding design and Design-Builders markup for profit, overhead and taxes. Existing areas planted with Warminster Broom shall be replanted with desirable species.

**2. City Entrance Enhancement Areas**, as shown on sheet 1 of 9, titled “corridor continuity and enhancement opportunity analysis” in Appendix M7.

Design-Builder shall coordinate landscape design for the City Entrance Enhancement Areas with the Community Involvement Advisory Group noted in Section 2.9 (Public Information And Community Involvement Plan). For City Entrance Enhancement Areas, the Design-Builder shall include in the Proposal Price and perform landscaping valued at a minimum of \$1,300,000 excluding design and Design-Builders markup for profit, overhead and taxes, broken out approximately as follows: 41<sup>st</sup> Street Interchange - \$200,000. Pacific Avenue - \$400,000. US 2 and Everett Avenue - \$500,000. Marine View Drive - \$200,000. Refer to Appendix M7 for conceptual drawings.

**3. City and Community Corridor Enhancement Areas**, as shown on sheet 1 of 9, titled “corridor continuity and enhancement opportunity analysis” in Appendix M7. Design-Builder shall coordinate landscape design for the City and Community Corridor Enhancement Areas with the Community Involvement Advisory Group noted in Section 2.9 (Public Information And Community Involvement Plan). For City and Community Corridor Enhancement Areas, the Design-Builder shall include in the Proposal Price and perform landscaping valued at a minimum of \$100,000 excluding design and Design-Builders markup for profit, overhead and taxes, for these areas combined. Refer to Appendix M7 for conceptual drawings.

**4. Neighborhood Enhancement Areas** - as shown on sheet 1 of 9, titled “corridor continuity and enhancement opportunity analysis” in Appendix M7. Design-Builder shall landscape Water Quality sites 1 and 2 per the drawings in Appendix M7. Design-Builder shall coordinate landscape design for Summit Park with the Community Involvement Advisory Group noted in Section 2.9 (Public Information And Community Involvement Plan). For Neighborhood Enhancement Areas, the Design-Builder shall include in the Proposal Price and perform landscaping valued at a minimum of \$550,000 excluding design and Design-Builders markup for profit, overhead and taxes, broken out as follows: Water Quality Site 1 - \$400,000. Water Quality Site 2 - \$50,000. Summit Park - \$100,000. Refer to Appendix M7 for conceptual drawings.

**5. Water Quality Sites 3, 4, 5, and 6**

For Water Quality Sites 3, 4, 5 and 6, Design-Builder shall include in the Proposal Price and perform landscaping valued at a minimum of \$20,000 combined, excluding design and Design-Builders markup for profit, overhead and taxes

**2.14.4.4 Aesthetic Treatment of Design Elements**

Design-Builder shall apply Aesthetic Design Standards (RFP Appendix L) in its design of all elements throughout the Project so that the Project has a coordinated visual appearance that blends the Project into the overall highway corridor (form, color, texture, etc.) and connects to the community context. Unique design elements may be developed for community enhancement areas and identified areas within the corridor, subject to the approval by the WSDOT Aesthetic Review Team. Where unique design is incorporated, the features must blend with existing elements and follow the standards defined in the Aesthetic Design Standards. The standards defined in the Aesthetic Design Standards must be incorporated into Design-Builders proposals for unique design features.

**2.14.4.5 Disturbance of Landscape Outside the Right-of-Way**

Utility relocations will temporarily affect areas outside the Planned ROW Limits of the Project as identified in the Environmental Assessment, which may also impact vegetation. After a Relocation has been completed, Design-Builder shall backfill the utility facility to the proper standards and prepare the Site for future landscaping. (This includes the replacement of topsoil.)

The property owner will be responsible for the replacement of the actual vegetation as that owner is to be compensated for that vegetation as a cost to cure item. The cost to cure will be determined by an appraiser and the actual compensation paid will be a negotiable item to

be documented on the purchase contract as part of the acquisition process, if any. (All cost to cure items must be clearly stated on the ROW purchase contract and as such are subject to approval by the Director of Right of Way for the Department.)

#### **2.14.4.6 Planting Design Criteria**

##### **2.14.4.6.1 Roadside Restoration in Community Enhancement Areas**

*General.* Landscape elements should relate to the context of the community areas. City street tree plans shall be tied into to provide transition, relationship to community and pedestrian scale. Landscape plans shall include input from the Community Involvement process (Section 2.9) and shall be approved by the WSDOT Aesthetic Review Team. If elements of the landscape design exceed WSDOT standards, Design-Builder shall facilitate the establishment of funding partnerships and maintenance agreements with the City of Everett.

##### **2.14.4.6.2 City of Everett**

Design-Builder shall meet the applicable landscape and irrigation requirements of the City for areas outside of the WSDOT Right of Way and in doing so shall consider long-term maintenance concerns. See Section 2.9 (Public Information And Community Involvement Plan) for coordination and Community Involvement requirements.

##### **2.14.4.6.3 Plantings**

*General.* Design-Builder shall ensure that roadside restoration plantings within the I-5 corridor will follow the appropriate treatment level in the Roadside Classification Plan and generally follow a reforestation type concept using smaller initial-size plantings of native woody species arranged in natural-appearing mixed planting areas. Design-Builder shall plant selected vegetation in masses appropriate to viewing/design speed. Replace Warminster Broom planting areas with desirable plant species. Community enhancement areas should blend with community landscape elements and may include larger size, non-native plant species. The planting concept and plant list proposed by the Design-Builder for use on the Project must be approved by WSDOT. Permanent irrigation systems will only be used in areas where they are necessary for the long-term health and vigor of plants (such as planting areas enclosed by retaining walls or curbs, raised beds, etc.) and where city requirements apply. Temporary irrigation may be used to establish planting areas. Three years of establishment will be required for all roadside restoration areas. Plantings for the wetland mitigation site shall meet the requirements outlined in the Wetland Mitigation Plan (RFP Appendix W1), and shall be native species that meet the requirements outlined in the Plan. Plant establishment for the wetland mitigation shall be for 3 years.

*Planting Area Preparation.* Prior to planting, all planting areas shall be prepared for long-term, healthy vigorous growth of plants. Planting areas shall be free of weeds and undesirable vegetation prior to preparation of soils. Compacted soils will be ripped to loosen compaction. Debris shall be removed. Soils shall be amended with organics to loosen compaction, raise organic and nutrient content, and improve moisture retention. Mulch will be used over all planting areas to improve moisture retention and discourage weed growth.

**Grading.** Project grading shall appear natural and shall blend with surrounding landscape. Cut slopes shall connect to adjacent areas by rounding. Grading for the wetland mitigation site shall follow (RFP Appendix M7) (Water Quality Site 1) and adhere to the Wetland Mitigation Plan (RFP Appendix W1).

**Weed Control.** Planting areas should be weed free before planting. Control of noxious and invasive weeds will be required throughout the Project.

**Trees.** Design-Builder shall install trees to provide roadside functions. Design standards (clear zone, sight distance, setbacks, etc.) shall be followed for all locations. Tree in the highway corridor shall be included in the overall plant mix and should be spaced at 10 feet on center. Evergreen species shall be a minimum size of two feet. Deciduous species shall be ½ inch caliper. Trees in community enhancement areas shall tie into city street tree concepts. Deciduous street trees may be up to 2-inch caliper. Spacing for street trees shall not exceed 20 feet. Evergreen species shall not exceed 4 feet in height.

**Shrubs.** Design-Builder shall install shrubs in mass plantings appropriate to scale and shall evaluate the height of proposed shrub species in relation to landscape location, motorist visibility, pedestrian safety, and maintenance requirements.

**Groundcovers.** Groundcovers may be used in community enhancement areas to add color, texture, and seasonal interest to the landscape design.

**Vines.** Vines may be used along retaining walls to provide a visual softening of walls. Determine areas where vines will be appropriate and follow the Aesthetic Design Standards.

**Turf Sod.** If desired by the affected property owner, Design-Builder shall replace existing sod areas disturbed by construction with new sod. Sod may also be used in community enhancement areas if determined appropriate.

**Grasses.** Seeding of grasses will be used to provide temporary erosion control and to establish lawn areas where determined appropriate. Grasses within the I-5 corridor will be a WSDOT standard seed mix. Wild flowers may be included in seed mix if approved by the WSDOT. Community enhancement areas may have turf areas if maintenance agreements with City are developed. Turf for these areas can be developed using seed or sod.

### ***Erosion Control***

Design-Builder shall provide and install temporary erosion control measures per Temporary Erosion and Sediment Control Plan. It is desirable to use compost or arborist wood chips as an erosion control measure for all areas that will be planted.

## **2.14.4.7 Aesthetic Treatment of Structural Elements**

The Project structural elements include, but are not limited to all bridge components, retaining walls, and noise walls.

### **2.14.4.7.1 General**

**Design.** Design-Builder shall follow the Landscape and Aesthetic Reports (RFP Appendix L) to determine appropriate aesthetic treatment for structural elements. Design of aesthetic treatment shall have a multidisciplinary approach to assure uniformity and feasibility. Design-Builder shall consider the visual context when designing the aesthetic treatment of a

structural element and shall use aesthetic treatments that employ the use of color and texture, which can be further expressed by pattern reveals, bevels, shadow lines, surface finishes, and geometric form Work.

All treatment shall be coordinated with and approved by the WSDOT Aesthetic Review Team and shall incorporate community input for unique elements that blend with the standards in community enhancement areas.

When designing the aesthetic treatments, Design-Builder shall consider the following elements:

1. Provision of corridor continuity and opportunities for community connection.
2. Integration of the aesthetic treatment with the landscape design;
3. Continuity of the visual treatments within the highway corridor;
4. Consistency of signage, lighting, and architectural treatments
5. Relief, form, and proportion of structures within the Project
6. Use of texture and color to define aesthetic treatments
7. Unique elements included in the Design Documents must incorporate the standard as a component of the design and provide smooth visual transition.
8. Views of structural elements through/from the corridor will follow the Aesthetic Design Standards. Views of structural elements toward the highway can provide opportunity for unique elements.
9. Ease of maintenance and repair
10. Deterrence of vandalism and graffiti

For the noise walls, retaining walls and bridge components requiring a special finish, the Design-Builder shall construct these by using custom form liners. The Design-Builder shall construct custom form liner masters combining varying texture patterns to produce textured noise wall panels matching those that are shown on the Appendix M7A, Aesthetic Surface Finishes and Patterns.

Splicing of form liners between texture styles for forming the special combination finish shall conform to Section 6-02.3(14). However, splicing of form liners within the same texture style will not be allowed.

Following completion of the form liner masters, the WSDOT will inspect the form liner masters. The Design-Builder shall notify the WSDOT two weeks in advance of the day the form liner masters are to be inspected. The Design-Builder shall modify the form liner masters until receiving the approval of the form liner masters from the WSDOT. The Design-Builder shall not begin production of the noise wall panels until the form liner masters are approved.

#### **2.14.4.7.2 Bridges**

**General.** The quality of views to the structures are influenced by the form of the structural components, the balance between span length and structure depth, the avoidance of bulky appearance, and the continuity between bridge supports (both piers and abutments) and the superstructure. The scale and proportion of a bridge are important influences on its aesthetic quality.

The Design-Builder shall implement the conceptual surface finishes provided in Appendix M7A, Aesthetic Surface Finishes and Patterns, in conjunction with the guidelines provided in Appendix L, Landscape and Aesthetics Report and this section of the RFP at abutments and wall components of the following existing and new bridges:

- a. Bridge 5/628W, Southbound Mainline I-5
- b. Bridge 5/628N-N, Northbound Broadway general-purpose off-ramp
- c. Bridge 5/635E & W, Pacific Avenue
- d. Bridge 5/636E & W, Hewitt Avenue
- e. Bridge 5/640E & W, Everett Avenue
- f. Bridge 5/642, 23<sup>rd</sup> Avenue

The determination of which of the patterns and finishes provided in Appendix M7A, Aesthetic Surface Finishes and Patterns, to be used at the locations listed above shall be proposed by the Design-Builder and subject to approval by WSDOT. A 3 pattern style group are expected to be used.

#### **2.14.4.7.3 Walls**

The Design-Builder shall implement the conceptual surface finishes provided in Appendix M7A, Aesthetic Surface Finishes and Patterns, in conjunction with the guidelines provided in Appendix L, Landscape and Aesthetics Report and this section of the RFP at the following locations:

- A. At the beginning and end of noise walls, for a distance on each end of the wall of 200' or 10% of the wall length (whichever is less) unless otherwise noted. This treatment shall be on the side of the noise wall that faces I-5.
- B. The full length of the following noise walls on the side of the noise wall that faces I-5:
  - a. Noise Wall NW3
  - b. Noise Wall NW3B
  - c. Noise Wall NW4
  - d. Noise Wall NW5
  - e. Noise Wall NW6
  - f. Noise Wall NW7
- C. The full length and on both sides of the following walls:
  - a. Noise Wall 7 and component retaining wall, if any. The pattern and finish applied on the side of the noise wall facing Summit Park requires the concurrence of the Everett Parks Department.
- D. At retaining walls visible to the traveling public from I-5 or City Streets, for the full length of the wall.

For A, B, C and D above, the determination of which of the patterns and finishes provided in Appendix M7A, Aesthetic Surface Finishes and Patterns, to be used at the locations listed above shall be proposed by the Design-Builder and subject to approval by WSDOT. All 3 patterns are expected to be used.

- E. The side of noise walls, which face away from I-5 shall have special aesthetics treatment with custom form liners. Aesthetic treatment of these surfaces may vary from standards where viewed by the community, neighborhoods, trail users and from the adjacent ROW (outside of walls). Development of the aesthetic treatment for walls viewed from the neighborhoods, trail users and from the adjacent ROW (outside of walls) shall include community input (Section 2.9). The Design-Builder shall develop 3 aesthetic surface finishes and present to the adjacent community for selection.

For A, B, C, D and E above, design the proposed treatment to be a part of the wall, regardless of the wall construction.

#### **2.14.4.7.4 Paving**

**General.** Aesthetic treatment may be used in community enhancement areas to paving of selected and approved areas including medians between curbs, planter strips between the curb and sidewalk, and special pavements at selected crosswalks. Use aesthetic treatments such as colored concrete or imprinted patterns.

#### **2.14.4.7.5 Lighting**

**General.** The Department has a lighting standard to be used at interchanges and intersections. Any lighting feature or enhancement that exceeds this standard may only occur in community enhancement areas and must include a funding partnership/maintenance agreement with the City. If the Design-Builder's Proposal uses additional lighting as an aesthetic feature, the lighting levels shall be designed to avoid glare, distraction, impairment of night vision, or other conditions that may compromise safe driving condition.

#### **2.14.4.7.6 Fencing**

Where fencing is required, dark brown PVC coated chain link fence shall be used.

#### **2.14.4.7.7 Sculpture and Art**

Design-Builder shall coordinate incorporation of specialty elements in community enhancement areas of the ROW, such as flags, banners, sculpture, or artwork, with the Subcommittee(s), if they desire such improvements. These elements exceed WSDOT standards and require a funding partnership with the City. The WSDOT Aesthetic Review Team must approval these elements.

#### **2.14.4.7.8 Plant Establishment**

The Design-Builder shall perform plant establishment activities as outlined in the Standard Specifications. The Roadside Restoration areas shall have three years of plant establishment meeting the standards as outlined in the Section 2.30. The Water Quality Treatment Facility #1 Site shall have a 3-year plant establishment warranty

#### **2.14.4.7.9 Invasive Weed Control**

##### **Weed Control After Planting**

Weeds and invasive plant species in the planting areas must be controlled through the life of the Project. Water Quality Facility #1 (Wetland Mitigation Site) shall meet the requirements of the Standard of Success for the 3-year period as outlined in the Wetland Mitigation Report (RFP Appendix W1). A Weed Control Plan must be submitted to WSDOT for approval prior to instituting weed control measures. Control of noxious weeds shall occur throughout the Project limits for the life of the Project. Integrated vegetation management strategies shall be used to control weeds.

##### ***Chemical Weed Control***

If Design-Builder shall propose the use of chemical weed control, the application of the chemicals must be performed by a licensed applicator in accordance with the Weed Control Plan and documentation of the application of the chemicals must occur as outlined in the WSDOT Standard Specifications. Design-Builder shall ensure that the chemical product will not damage or kill the surrounding desirable plant material.

#### **2.14.4.7.10 Aesthetic Treatment Maintenance**

Design-Builder shall maintain the appearance of the aesthetic treatments on any walls or bridges until Project Completion, and shall clean up any damage caused by vandalism.

### **2.14.5 Submittals**

#### ***Roadside Restoration and Aesthetic Treatment Draft Master Plan***

Before community involvement occurs, Design-Builder shall provide a Roadside Restoration and Aesthetic Treatment Draft Master Plan to the Department for approval. The plan will detail all aspects outlined in this Section.

#### ***Final Roadside and Aesthetic Treatment Plan***

Design-Builder shall provide a Final Roadside Restoration and Aesthetic Treatment Plan that indicate the location and treatment strategies for all planting and aesthetic treatment within the Project as outlined in this Section. The Plan shall include names and locations of all plants; limits and types of soil improvements and mulch; irrigation system components; seeding or turf sod limits; and aesthetic treatment locations and designs. Design-Builder shall provide cross sections or elevations if needed for graphic clarity. See also Section 2.1.1 (General Requirements) for general submittal requirements.

#### ***Roadside Work Plan and Weed Control Plan***

Design-Builder shall submit a Roadside Work Plan and a Weed Control Plan in accordance to WSDOT Standard Specifications for approval by WSDOT prior to construction activities occurring in the roadside. Design-Builder shall provide copies of all pesticide application records.

***Samples***

Design-Builder shall submit samples of proposed organic topsoil, soil amendments and mulches for Department review and approval before final selection. Design-Builder shall submit photos and examples of proposed colors, textures, patterns, and other aesthetic treatments to be applied to the Project structures and paving for Department review and approval prior to final selection.

***As-Built Plans***

At Physical Completion, Design-Builder shall provide the Department, as part of the As-Built Plans, as-built drawing of the installed irrigation system, and the installed plantings keyed by botanical name and size if there is a variation from the accepted planting plan.

## **2.15 SIGNING**

**Abbreviations**

AAH	Adopt A Highway
CPM	Current Practices Manual
DMS	Dynamic Message Signs
HAC	High Accident Corridors
HAL	High Accident Locations
HAR	Highway Advisory Radio
HOV	High Occupancy Vehicle
MIS	Motorist Information Signs
PAL	Pedestrian Accident Locations
VMS	Variable Message Sign

### **2.15.1 General**

The Design-Builder shall design, furnish, and install the sign system, including both temporary and permanent signs, for all roadways in accordance with the requirements of the Contract Document, including Reference Documents, performance requirements, design and construction criteria, and submittals.

**Core Elements**

The following subsections contain the proposed locations of the core Signing elements that shall be included with the Design-Builder's Proposal.

The Design-Builder shall be responsible for determining the number and location of proposed Signing components required by the Referenced Standards (Section 2.15.4.1) that are in addition to the core Signing elements.

A plan of the core Signing elements in the I-5 corridor is provided in Appendix M. This plan is provided to show the major Signing elements to be designed and constructed.

WSDOT will consider proposals that relocate the core Signing components, provided the same level of functionality is obtained.

Signing elements shall include but not be limited to the following:

***Mainline I-5 – Northbound***

1. A cantilever structure shall be installed on the right shoulder to accommodate a highway advisory radio (HAR) sign at LR STA 102+00.
2. A sign bridge structure shall be installed at LR STA 143+00 to accommodate two advance guide signs for exit 189 only. The Vancouver B.C. sign shall not be used.
3. The existing truss sign bridge, signs and all appurtenances at LR STA 145+20 shall be removed.
4. The existing generic Motorist Information Sign (MIS) at milepost 188.36 shall be removed.
5. A sign bridge structure shall be installed at LR STA 154+95 to accommodate the exit direction guide signs for exit 189.
6. The existing truss sign bridge, signs and all appurtenances at LR STA 159+00 shall be removed.
7. The existing truss sign bridge, signs, and all appurtenances at LR STA 170+90, 63.50' RT, shall be removed and replaced with a new structure in the same location.
8. A cantilever structure shall be installed on the left at LR STA 266+25 to accommodate an HOV regulatory sign.
9. A sign bridge structure shall be installed at LR STA 282+00 to accommodate the left side one-mile advance guide sign for the direct access exit and the right side one-mile exit only advance guide sign for the drop lane condition at exit 192. The verbiage for both the Naval Station and the Port of Everett shall be removed from this overhead sign series and replaced with a single shoulder mounted supplemental guide sign.
10. Port of Everett is signed in two locations on northbound Interstate 5. The Design-Builder shall contact the city to determine which exit they want used to sign to their port.
11. All existing signs for the left-hand Broadway exit (192) shall either be removed or relocated to the right-hand side of the road. The MIS signs shall be placed in the correct order per the MIS manual.
12. A sign bridge structure shall be installed at LR STA 308+60 to accommodate an exit only advance guide sign for the drop lane condition at exit 192 and a variable message sign (VMS). The drop lane skip striping shall begin at this location.
13. The existing monotube cantilever structure, sign, and all appurtenances at LR STA 331+16 shall be removed.
14. A cantilever structure shall be installed at FR STA 10+00 to accommodate the exit only direction guide sign for the drop lane condition at exit 192.
15. A cantilever structure shall be installed at LR STA 345+00 on the left shoulder to accommodate the exit direction sign for the HOV direct access exit.
16. The existing truss sign bridge, signs, and all appurtenances at LR STA 349+25 shall be removed.
17. A cantilever structure shall be installed at LR STA 355+00 to accommodate the one-mile advance guide sign for exit 193. This installation shall include a hospital plaque

- above the guide sign. The city center verbiage shall be dropped from this overhead sign series.
18. The existing shoulder-mounted VMS at LR STA 361+95 shall be removed.
  19. The existing Sound Transit/Everett Events Center sign assembly at LR STA 370+50 shall be relocated to LR STA 363+50.
  20. A bridge mounted sign bracket shall be installed on the Cascade View overpass at LR STA 371+50 to accommodate a HAR sign. The sign shall be centered over the lanes.
  21. A cantilever sign structure shall be installed at LR STA 395+95 to accommodate a special design advance guide sign for the drop lane condition at exit 194. This sign shall have verbiage for Pacific Ave @ exit 193 as well. The right half of the sign on northbound Interstate 5 at milepost 153.42 (visible on SRView @ 153.40) shall be used as a model for this sign.
  22. The existing truss sign bridge, signs, and all appurtenances at LR STA 396+06 shall be removed.
  23. A sign bridge structure shall be installed at LR STA 414+50 to accommodate an advance exit only guide sign for the drop lane condition at exit 194 and an exit direction guide sign for exit 193. The signing for exit 193 at this location shall include the hospital plaque.
  24. The existing truss sign bridge, signs and all appurtenances at LR STA 416+15 shall be removed.
  25. The existing shoulder mounted sign at LR STA 422+29 for Stevens Pass shall be removed.
  26. A sign bridge structure shall be installed at LR STA 427+55 to accommodate an HOV sign, an exit only one-mile advance guide sign for the drop lane condition at exit 195, and the exit direction guide sign for exit 194. The verbiage for Port of Everett shall be dropped from all overhead signs in this series and replaced with a single shoulder mounted supplemental guide sign.
  27. The existing truss sign bridge, signs, and all appurtenances at LR STA 432+21 shall be removed.
  28. A cantilever structure shall be installed at LR STA 446+00 to accommodate an advance exit only guide sign for the drop lane condition at exit 195.
  29. The two bridge mounted sign brackets, signs, and all appurtenances on the 23<sup>rd</sup> St overpass shall be removed.
  30. The existing truss cantilever structure, sign, and all appurtenances at LR STA 477+13 shall be removed and replaced with a new structure at the same location.
  31. The end of the HOV lane shall be signed in accordance with the NW Region's HOV Design Guide.
  32. The existing steel posts and foundations at LR Sta. 335 + 87 Rt. shall be removed.

### ***Mainline I-5 – Southbound***

1. The existing Sound Transit sign assembly at milepost 195.70 shall be relocated to milepost 195.85.
2. A sign bridge structure shall be installed at milepost 195.65 to accommodate a VMS.
3. A hospital plaque shall be installed above the existing one-mile advance guide sign for exit 194.
4. A cantilever structure shall be installed at milepost 195.35 to accommodate a HAR sign.

5. The beginning of the HOV lane shall be signed in accordance with the NW Region's HOV Design guide. The R3-10 MOD will be located on the Snohomish River bridge structure approximately  $\frac{1}{4}$  mile prior to the beginning of the lane using a barrier mounted sign bracket. The WSDOT Bridge & Structures Office normally does the design of these brackets.
6. A cantilever structure shall be installed at LL STA 689+90 on the left to accommodate an HOV sign.
7. A cantilever structure shall be installed at LL STA 688+00 to accommodate an advance exit only guide sign for the drop lane condition at exit 194.
8. The existing City Center/Naval Station/Stevens Pass sign shall be replaced, and relocated to comply with WSDOT's sign spacing guidelines. The Stevens Pass verbiage shall be removed.
9. The existing bridge mounted sign bracket, sign, and all appurtenances on the 23<sup>rd</sup> St overpass shall be removed.
10. A cantilever structure shall be installed LL STA 675+00 to accommodate the exit only exit direction sign for the drop lane condition at exit 194.
11. The existing truss sign bridge, signs, and all appurtenances at JL2 STA 16+10 shall be removed.
12. A sign bridge structure shall be installed at JL2 STA 16+00 to accommodate follow through guide signing for exit 194.
13. A cantilever structure shall be installed at LL STA 635+00 to accommodate a  $\frac{3}{4}$  mile advance guide sign for exit 192.
14. A cantilever structure shall be installed at LL STA 601+90 to accommodate the exit direction guide sign for exit 192.
15. The existing truss sign bridge, signs, and all appurtenances at LL STA 597+45 shall be removed.
16. A cantilever structure shall be installed at E STA 14+98 to accommodate the direct access sign for the on ramp to SB I-5.
17. A cantilever structure shall be installed at LL STA 535+00 on the left to accommodate an HOV sign.
18. A sign bridge structure shall be installed at LL STA 522+50 to accommodate a VMS.
19. A cantilever structure shall be installed at LL STA 513+00 to accommodate an HAR sign.
20. A sign bridge structure shall be installed at LL STA 492+00 to accommodate a 1-mile advance guide sign for exit 189 to SR 527 etc. and a 1-mile advance exit only guide sign for the drop lane condition at exit 189 to West SR 526.
21. All existing signs shall be relocated to maintain proper sign spacing. All MIS signs shall be relocated so they are in the correct order per the MIS manual.
22. The existing monotube sign bridge, signs, and all appurtenances at LL STA 475+40 shall be removed. The structure shall be removed with no damage and shall be delivered to the Pilchuck pit site. Design-Builder contact Craig Harvey at 425-339-3825 three-business days prior to delivery.
23. A sign bridge structure shall be installed at LL STA 466+50 to accommodate the  $\frac{1}{2}$ -mile advance guide sign for exit 189 to South SR 527 etc. and a  $\frac{1}{2}$ -mile advance exit only guide sign for the drop lane condition for exit 189 to West SR 526 etc. The mileage indication sign may only be removed from the exit only sign.

24. The existing truss sign bridge, signs, and all appurtenances at LL STA 447+50 shall be removed.
25. A sign bridge structure shall be installed at LL STA 443+00 to accommodate the two exit direction guide signs for exit 189. The destination messages shall be the same as the previous signs for this exit.
26. The existing truss sign bridge, signs, and all appurtenances at LL STA 441+00 shall be removed.
27. A sign bridge structure/cantilever combination structure shall be installed at LL STA 423+70 to accommodate follow through signing on the ramp of exit 189. The cantilever section shall accommodate the one-mile advance for the rest area/weigh station. The sign shall be centered over the outside mainline lane.
28. The existing truss sign bridge, signs, and all appurtenances on the off ramp at mainline station LL STA 423+55 shall be removed.
29. The existing bridge mounted sign bracket, sign, and all appurtenances on the SR 527 overpass for the SR 99/SR 527 exit shall be removed and replaced with a new bracket, sign and light(s). The sign shall reflect the exit only / ok condition for the exit.
30. The existing Begin HOV Lane sign on the SR 527 overpass shall be replaced with an R3-1401.
31. The existing concrete foundations and all related items, transition and type 4 barriers in the median at LL STA 671+40 RT shall be removed. Install new type 2 barriers to match existing conditions.
32. The existing concrete foundation, truss structure, electrical items and all related materials at LL STA 671+40 LT shall be removed. The related guardrail run shall be removed.
33. The existing steel posts and foundations and foundations at LL STA 681+67 LT shall be removed.

### ***Westbound US 2***

A new HAR sign shall be installed on the existing truss sign bridge at approximately milepost 2.0 on westbound US 2.

### ***Eastbound SR 526***

A cantilever structure shall be installed at milepost 3.10 to accommodate a HAR sign. The sign shall be placed as close to the through lanes as the maximum span of a cantilever will allow. The existing MIS sign at milepost 3.04 shall be relocated back of its current location to maintain the 800' spacing between signs. The existing "right 2 lanes must exit" sign shall be relocated to midpoint between the new cantilever and the existing sign bridge at the Evergreen Way exit.

### ***Broadway @ 41<sup>st</sup> St. Overpass***

The bridge mounted sign and bracket for the Broadway exit on the 41<sup>st</sup> St. overpass shall be removed and replaced with an updated sign and bracket.

### ***Southbound on-ramp from Broadway***

A cantilever structure shall be installed at NB Broadway off-ramp line station FL STA 43+90 on the left to accommodate an HOV only exit direction sign for the left side ramp to mainline HOV. The HOV exit shall be signed in advance, possibly in the raised traffic island prior to the 41<sup>st</sup> St Overpass.

Note:

A Signing Type, Size, & Location Plan has been included as part of the Conceptual Plans (RFP Appendix M5). All existing and proposed overhead sign locations in this document and RFP Appendix M5 are approximate and shall be verified, and relocated if necessary, by the Design-Builder during the design process. Structures should be kept as close to these locations as possible. If there is a conflict between Section 2.15.1 and the Signing TS&L in RFP Appendix M5, the Design-Builder shall use Section 2.15.1.

All cantilever structures are located on the right unless otherwise noted.

#### ***41<sup>st</sup> Street***

The existing truss structure approximately 580' west of southbound I-5 shall be removed and replaced with a new sign bridge. Relocate existing signs and sign lights to new structure.

### **2.15.2 Warranty**

Design-Builder shall warrant signing work in accordance with Section 2.30 – Warranties.

### **2.15.3 Maintenance During Construction**

Design-Builder shall maintain the sign system during construction in accordance with the requirements in Section 2.27 – Maintenance During Construction.

### **2.15.4 Mandatory Standards and Reference Documents**

#### **2.15.4.1 Mandatory Standards**

**General.** Design-Builder shall design and construct the sign system in accordance with the requirements of the Mandatory Standards listed in Table 2.15.1. The documents in Table 2.15.1 are listed in order of priority. The Department may require signing that exceeds minimum standards when appropriate conditions arise.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.15.1**

Mandatory Standards for Signing

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	n/a		Proposal
2	WSDOT	Modifications to MUTCD	N/A		MUTCD
3	WSDOT	Traffic Manual M51-02	N/A		TM
4	WSDOT	Design Manual For Design Build Projects	M22-02		RFP Appendix Z
5	WSDOT	NWR Traffic Operations Redbook	N/A	*	Redbook****
6	WSDOT	Sign Fabrication Manual	N/A		Sign Fab Man
7	WSDOT	Standard Plans for Road, Bridge, and Municipal Construction	N/A		STD PLANS
8	WSDOT	Highway Design Manual For Design Build Projects	N/A		
9	FHWA	Manual on Uniform Traffic Control Devices (Millennium Edition)	MUTCD		MUTCD

\* If no date is given, the most current version as of the initial publication date of this RFP is specified.

\*\* Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.

\*\*\* Includes the original release of the RFP and all addendums.

\*\*\*\* Refer to “Redbook” in the following instances:

1. Add and/or Drop lanes.
2. Lane Reductions.
3. On/Off Ramps and Off Ramp Terminals.
4. Weave Sections.
5. Transit/Flyer Stop/HOV Direct Access and other HOV signing.
6. Ramp Gore Area and Chevron Markings Layouts.
7. Emergency Services and Supplement (Plaque) Signing
8. Adopt-A-Highway
9. Fire Hydrant Signing
10. Highway Advisory Radio Signing
11. Logo Signing

#### 2.15.4.2 Reference Documents

Design-Builder shall use the Reference Documents listed in Table 2.15.2 as supplementary guidelines for the design, provision, installation, and construction of the signing improvements. These Reference Documents have no established order of precedence.

**Table 2.15.2**  
**Reference Documents for Signing**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	Construction Manual	N/A		
WSDOT	Plans Preparation Manual	N/A		Plans Prep
WSDOT	Maintenance Manual	N/A		
WSDOT	HOV Design Guide for the Northwest Region	N/A		
AASHTO	A Policy on Geometric Design of Highways and Streets	S99-GDHS-3	2001	“Green Book”
WSDOT	MIS Guide	M55-94	2000	

### **2.15.5 Performance Requirements**

Design-Builder shall design, furnish, and install all components of a sign system necessary to provide a complete and functional system that meets the following performance requirements:

1. Provides for the orderly and predictable movement of all traffic.
2. Provides such guidance and warnings as are needed to ensure the safe and informed operation of individual elements of the traffic stream.

#### **2.15.5.1 Meetings**

The Design-Builder shall meet regularly with WSDOT and affected Cities and Counties to resolve signing issues during design and construction. These meetings may be reduced in frequency, as major signing issues are resolved.

#### **2.15.5.2 Permanent Sign Concept Meeting**

The Design-Builder shall schedule a concept meeting(s) for permanent signing 30 calendar days after Notice to Proceed. The purpose of the meetings is to present a sketched layout of the in-place signing on the Project to the Department. The Design-Builder shall use the meeting to confirm the requirements for the permanent signing needs of the Project.

#### **2.15.5.3 Design-Builder’s Personnel**

See General Provisions Section 1-011.6 - Design-Builder Personnel.

### **2.15.6 Design and Construction Criteria**

The Design-Builder shall conduct all Work necessary to meet the requirements for signing in accordance with this RFP.

The Design-Builder shall be responsible for determining the number and location of proposed signs and their components required by the Mandatory Standards (Section 2.15.4.1)

### **2.15.6.1 Miscellaneous Requirements**

The Design-Builder shall include each sign on a signing plan and specification sheet in accordance with the CMP. In addition, signing details plan sheets shall be developed for all signs that are not included in WSDOT's Sign Fabrication Manual. For overhead signs, sign elevation sheets showing the sign position in relation to the travel lanes and the position of the sign lighting fixtures in relation to the sign panel shall be provided. Prior to fabrication of any sign elements, a guide sign concept plan with proposed formats shall be submitted to the Department for review. Any modifications made to "R" and "W" series signs shall be submitted to the Department for approval. This process should take one to two weeks. The remainder of the Design-Builder's design will be reviewed in accordance with General Provisions Section 1-011.9 (Design Review and Oversight Visits). Modifications to W series symbol signs shall not be allowed.

### **2.15.6.2 Software**

The Design-Builder shall use software for the design that is compatible with and/or can be imported to the latest version of MicroStation. Sign Specifications shall be entered using the NW Region version of WSDOT's SignSpec2000 Microsoft Excel program. NW Region uses only the sheet titled "Sign Installation Specifications" (sheet tab "Sign Sp #"). The relocation and removal sheets shall not be used in the plans. The SignSpec2000 Microsoft Excel program can be accessed through this link:

<http://www.wsdot.wa.gov/Regions/Northwest/Traffic/SignDesign/htm/signdesign.htm>

### **2.15.7 Design Requirements**

The Design-Builder shall design the signing in accordance with Chapter 820 of the Design Manual for Design Build Projects and with the Northwest Region's "Sign Design Current Practices Manual" (CPM).

The CPM can be accessed through this link:

<http://www.wsdot.wa.gov/Regions/Northwest/Traffic/SignDesign/htm/signdesign.htm>

#### **2.15.7.1 High Accident Location and High Accident Corridor Signing**

The Design/Builder shall be responsible for addressing all signing recommendations for High Accident Locations (HAL), High Accident Corridors (HAC) and Pedestrian Accident Locations (PAL) within the Project limits.

The Design-Builder shall utilize the NW Region Signing PS&E Checklist (RFP Appendix O4) to obtain information on potential HAC and HAL locations within the Project limits.

The signing plans for these areas shall be submitted to the Department for comments and concurrence prior to installation.

### **2.15.7.2 Sign Inventory**

The Design-Builder shall conduct a field review and prepare a site inventory of the existing signing within the Project limits and impacted signs outside the Project limits in accordance with Section III of the Northwest Region’s CPM.

The field review shall include a review of Site features that have an impact on the sign design including physical obstructions and structures, terrain features, roadway geometry, and space limitations. The field review shall also consider signing constructability and maintainability.

Design-Builder shall gather data on the existing signing for the Project. The data shall be gathered in the field and entered on a sheet called the “Signing Inventory Sheet”(RFP Appendix F9). All columns in the inventory represent vital data needed to complete comprehensive and accurate signing plans.

The Sign Inventory shall include, but not be limited to, the following items:

- 1) All existing signs within the Project limits shall be inventoried whether they are impacted by the widening or not. Some signs outside the Project limits may be impacted by changes to the signing within the limits – these signs shall be inventoried also.
- 2) The following information shall be provided for each sign:
  - a) Location of sign by station or milepost
  - b) Horizontal distance from the edge of traveled way
  - c) Legend for each sign
  - d) Size of each sign
  - e) Sign material
  - f) Condition of sign face
  - g) Post type, size and length
  - h) Condition of post
  - i) Vertical Clearance of Sign
  - j) Build Date

### **2.15.7.3 Existing Sign Requirements**

All existing signs shall be inspected and removed, replaced, relocated or left in place as necessary whether they are impacted by the widening or not. This shall include impacted signs outside the Project limits.

Design-Builder shall evaluate, remove and reuse existing signs in accordance with the NW Region CPM. See Section III D, “Project Inventory of Existing Signs” and Section IV G, “Evaluation of Existing Signs”. If a sign has no date, it is considered out of date and shall be replaced. The criteria for sign replacement is as follows:

- Replace all ground mount signs that will be over 7 years old at Project Completion.
- Replace all unlighted overhead signs that will be over 7 years old at Project Completion

- Replace all illuminated overhead signs that will be over 10 years old at Project Completion

The age of the sign shall be based on the date sticker on the back of the sign.

Any city or county street signs impacted by this Project shall be brought up to the city or county standards. Coordination shall be through the Department.

Unless otherwise noted in this document, all existing signs/sign messages shall be maintained during construction.

#### **2.15.7.4 Guide Sign Requirements**

Design and installation of Guide Signs shall be in accordance with the NW Region CPM. See Section IV, “Preliminary Signing Plan” and Section V “Sign Design”.

All major guide signs throughout the Project shall be overhead.

Unless noted otherwise in the Contract Documents, the following will apply:

- Guide signs shall be limited to two messages.
- One supplemental guide sign is allowed approximately half way between the two primary guide signs and is allowed a maximum of two destinations. All exits shall at a minimum have the following overhead signs:
  - Advance guide sign of at least 1 mile
  - Exit direction signs placed at the beginning of the exit taper.
  - Drop lane conditions shall have an additional guide sign halfway between the advance and exit direction signs.
- All advance and supplemental signs shall have the same message as contained on all subsequent signs.
- Directional ramp signing that does not have related mainline signs shall not be allowed.
- All mainline guide & MIS signs must be represented on the ramps.

#### **2.15.7.5 Specialized Guide Sign Requirements**

Design and installation of Specialized Guide Signs shall be in accordance with the NW Region CPM. See Section IV, A, 4 “Guide Signs” and Section V “Sign Design”.

##### **2.15.7.5.1 MIS Sign Requirements**

1. All MIS signs shall be shoulder mounted.
2. When MIS signs are relocated they shall be in the correct order per the MUTCD.

3. MIS signs are to remain in place and be visible for as long as possible during construction activities. If the removal of any MIS signing is required because of construction, the Design-Builder will be instructed by WSDOT to salvage and reinstall existing MIS sign at a location determined by WSDOT. Existing MIS signs shall be relocated, replaced or temporarily mounted within two weeks of removal.
4. WSDOT Sign Crews shall have access to MIS Panels during construction activities to install, replace, or remove existing logo signs or back panels, or perform other needed Work.
5. The Design-Builder may move existing MIS signs as directed by WSDOT to accommodate other guide or regulatory side requirements.
6. MIS signs shall not be permanently removed as a result of the Work.

#### **2.15.7.5.2 HOV Signing Requirements**

HOV signs will be placed according to the WSDOT Design Manual for Design Build Projects and NWR HOV Design guide.

#### **2.15.7.5.3 Temporary Signing Requirements**

See Section 2.20 Maintenance of Traffic (MOT)

#### **2.15.7.6 Sign Fabrication Requirements**

Sign fabrication shall be in accordance with the NW Region CPM. See Section V “Sign Design”.

All signs within State Right of Way and/or limited access shall be in accordance with the Sign Fabrication Manual. Signs may be modified but need WSDOT approval as follows:

- Guide signs (including MIS) – NW Region Sign Design
- Regulatory signs – State Traffic Engineer @ WSDOT HQ WSDOT HQ
- Warning signs – State Traffic Engineer @ WSDOT HQ WSDOT HQ

*Note:* Pictorial warning signs may not be altered without approval from FHWA.

#### **2.15.7.7 Sign Location**

Sign location shall be in accordance with the NW Region CPM. See Section VI “Sign Installation”.

Supplemental messages and MIS signs shall be shoulder mounted.

A minimum distance of 800 feet between major guide, supplemental guide, and motorist information signs (MIS) shall be maintained on the mainline.

Distances less than 800 feet shall require concurrence by the Department.

Desired sign spacing on ramps shall be a minimum of 100 feet.

Barrier mounted sign supports shall have a minimum of 4 feet of shoulder on either side of the barrier. Barrier mounted signs shall be mounted 9 feet above the roadway.

### **2.15.7.8 Sign Foundations**

See Section 2.6 & 2.12.

### **2.15.7.9 Overhead Signing Requirements**

Overhead signing shall be in accordance with the NW Region CPM. See Section V “Sign Design”, and Section VI “sign Installation”.

For all overhead sign structures, the Design-Builder shall provide sufficient electrical conduit in the foundation to accommodate future sign lighting. The Design-Builder shall light regulatory signs on overhead sign structures. The Design-Builder shall light all signs on the overhead sign structure if one sign on the structure requires lighting.

If the highway is designated as a house-moving route, the Design-Builder shall have a minimum clearance of 23 feet for all overhead sign structures. When determining the minimum clearance, the Design-Builder shall include future walkways for sign lighting and take the minimum clearance of 23 feet from the bottom of the walkway.

Refer to Section 2.12 for structural design of sign supports.

### **2.15.7.10 Sign Structures**

Sign structures shall be in accordance with the NW Region CPM. See Section VI “Sign Installation”.

All sign structures being removed shall be identified by the structure ID number on both the plan sheets and the specification sheets. This number should be on an aluminum plate attached to the structure. If no number can be found Design-Builder shall contact the WSDOT.

The Design-Builder shall contact the WSDOT for structure ID numbers when replacing/relocating existing sign structures or installing new sign structures.

*Existing Sign Structures:* all existing sign structures shall be removed and become the property of the Design-Builder, except as noted in this RFP.

#### **2.15.7.10.1 Sign Posts**

Shoulder mounted signposts shall be either W-beam, steel pipe, or PSST (perforated steel square tube) according to the Design Manual and WSDOT Standard Plans (RFP Appendix C). All PSST signposts shall have a 4' tall 2 ¼ x 2-¼ inch insert. All signposts not protected by barrier/guardrail shall have a slip base. W beam posts shall not be used for single post signs. Wood posts shall be removed and replaced with steel posts for all existing signing to remain. See Section 2.15.7.3 Existing Sign Requirements for suitability of existing signs.

#### **2.15.7.10.2 Sign Bridges and Cantilevers**

See Section 2.12 Bridge and Structures

All new sign structures shall be monotube type.

#### **2.15.7.11 Sign Lighting**

All overhead signs shall be illuminated per the Design Manual For Design Build Projects (DM) and the NW Region CPM. This Work shall be coordinated with the Electrical Design team.

#### **2.15.7.12 Signing Plan Submittals**

The Design-Builder shall provide a Guide Sign Plan for the entire Project as described in the Design Manual section 820.06. WSDOT will respond within 10 Business Days of receipt of each Guide Sign plan.

The NW Region Signing Checklist shall be used and submitted with each review.

All signs (removals, installs, and relocations) shall be shown on the same sheet (plan & specification). All signs to be removed shall be shown.

The Design-Builder shall provide Final Signing Plan for each ramp, roadway section as described in Section 2.15.6.1. WSDOT will respond within 10 Business Days of receipt of each Final Signing Plan.

All signs (removals, installs, and relocations) shall be shown on the same sheet (plan & specification). All signs shall be shown on plans, whether impacted or not.

#### **2.15.7.13 Permanent Signing Plan Requirements**

Permanent signing plans shall be in accordance with Section VII, A.3, "Plan Development" of the NW Region CPM.

The Design-Builder shall mark in the field locations of the proposed signs and conduct a construction design review with WSDOT before installation. The Design-Builder shall obtain WSDOT acceptance of all sign locations in the field prior to installation.

#### **2.15.7.14 Material Requirements**

Design-Builder shall provide signing materials that:

Are new at the time of installation, and unless otherwise noted, meet the requirements of Section 8-21 (Permanent Signing) of the WSDOT Standard Specifications.

*Reuse of Existing Sign Panels:* The Design-Builder shall **not** reuse any existing sign panels as part of the new permanent signing installation.

### **2.15.8 Construction Requirements**

#### **2.15.8.1 General**

All signs installed before their intended use by the traveling public shall be covered-up.

Positive guidance by the use of existing, interim and new signing shall be provided for the traveling public at all times during construction to ensure safe and informed operation while traffic is maintained on the roadway. The traffic control plan submitted by the Design-Builder shall address the use of interim signing and pavement markings during the transition from existing to new signing.

If the roadway alignment is shifted, refer to the Design and Traffic Manuals for proper lateral placement of permanent signs.

#### **2.15.8.2 Salvage**

Design-Builder shall salvage and deliver to the Department all existing monotube sign structures. Dispose of all other removed signing materials and structures. The Design-Builder shall salvage existing signs on frontage roads and make them available for pickup by the city or county to which the signs belong and shall notify the city or county 48 hours in advance of removal.

### **2.15.9 Submittals**

#### **2.15.9.1 Permanent Signing Concept Plan**

The Design-Builder shall develop a Permanent Signing Concept Plan for the Project that includes all necessary guide, warning, regulatory, and Dynamic Message Signs (DMS). The Permanent Signing Concept Plan shall be in accordance with the requirements Part IV “Preliminary Signing Plan” of the CPM. The Permanent Signing Concept Plan shall provide for modifications to signage outside the limits of the Project that are rendered inaccurate, ineffective, confusing, or unnecessary by the Project. The modifications shall include the addition, removal, or alteration of signs and appurtenances.

The Permanent Signing Concept Plan shall include and provide for all signing necessary for the Project inside and outside of the Project limits.

The Permanent Signing Concept Plan shall include as a minimum, the following:

1. Sign locations
2. Panel legends
3. Proximity to ITS devices, including DMS locations
4. Types of proposed sign structures
5. Permanent signing proposed on bridges
6. Signal system mast arm sign legends

### **2.15.9.2 Permanent Signing Plan**

The Design-Builder shall submit As-Built Plans for the signing system after construction is complete. Final Acceptance will not be granted until the As-Built Plans are submitted.

Prepare sign specification, plan, and detail sheets in accordance with Section VII, A.3, “Plan Development” of the NW Region CPM, Plans Preparation Manual (Division 5 & 6) and the Design Manual for Design-Build Projects (Section 820). A Professional Engineer’s original signature, date of signature, original seal, registration number, and date of expiration shall appear on the all plan and detail sheets. The Engineer-of-Record shall be registered as a civil engineer in the state of Washington. Plans shall be submitted on 11” x 17” white bond paper and in electronic format on a CD-ROM.

### **2.15.9.3 Release for Construction Signing Plans**

The signing plans shall be in accordance with Section VII, A.3, “Plan Development” of the NW Region CPM. The signing plans shall include as a minimum, the following:

1. Design drawings showing existing and proposed utilities
2. Design drawings showing type and location (station and offset) of signs
3. Panel sizes
4. Design drawings (other than WSDOT standard drawings) showing details of sign mounting, foundations, base connections, and frames
5. For each Type A and OH (Overhead) sign, depiction of a cross section with indication of footing details, offsets, and mounting heights
6. Complete design of overhead signs and sign structures, including provisions for sign lighting
7. Analysis of signal system mast arm loading for mast arm installed signs

## **2.16 ILLUMINATION**

### **2.16.1 Description**

#### **2.16.1.1 Abbreviations**

HPS High Pressure Sodium

### **2.16.1.2 General**

The Design-Builder shall perform all Work necessary to meet the requirements for illumination in accordance with this RFP, Standards and publications, performance requirements, design and construction criteria, warranty of Work, maintenance during construction, and submittals as are covered herein.

The electrical/illumination elements shall include but not limited to the following:

1. Light standards
2. Luminaires
3. Sign lights
4. Foundations
5. Junction boxes
6. Conduits and Wirings
7. Electrical services
8. Transformers and cabinets
9. Power supply for ITS systems
10. Power supply for Signal systems

### **Core Devices**

The following subsections contain the proposed locations of the core illumination elements that shall be included with the Design-Builder's Proposal.

The Design-Builder shall be responsible for determining the number and location of proposed illumination elements required by Section 2.16.2.1 that are in addition to the core illumination elements.

WSDOT will consider proposals that relocate the core illumination, provided the same level of functionality is obtained.

### **2.16.1.3 Highmast Illumination Systems**

Highmast illumination systems shall be installed at the following locations:

#### **SR99/SR527/SR526/SR5 Interchange – approx. MP 188.5 to MP 190.0**

- Continuous illumination shall be installed for the entire interchange from LL STA 371+00 to LL STA 443+00 and LR STA 160+20 to LR STA 231+00 within the limited access area of the interchange.
- Design-Builder shall remove and replace the existing 3 phase electrical service cabinet SAC 1231 and all associated highmast light standards, foundations, conduits, conductors, and junction boxes (except for three newer 40' light standards with cobra head fixture located at the I-5 NB ON Ramp and two newer highmast light standards with six luminaires arrangement located along the I-5 median). Erosion-control retaining wall shall be provided for service cabinet SAC 1231.

- Design-Builder shall remove and replace the existing 3 phase electrical service cabinet SAC 1232 and all associated highmast light standards, foundations, conduits, conductors, and junction boxes. New service cabinet shall be located approximately 200' north of the existing service cabinet at the SE quadrant of SR 526/Broadway intersection.
- Design-Builder shall remove and replace all under-deck light fixtures and associated conduits, conductors, junction boxes and NEMA 4X junction boxes located at SR527/I-5 undercrossing.
- Design-Builder shall remove and replace all underdeck light fixtures and associated conduit, conductors, junction boxes and NEMA 4X junction boxes located at the eastbound SR 526 to southbound I-5 undercrossing structure.

#### 2.16.1.4 Standard Illumination Systems

Standard illumination systems shall be installed at the following locations:

##### 41<sup>st</sup> St SE/Broadway Interchange – approx. MP 192.0 to MP 193.0

- Design-Builder shall remove and replace existing electrical service cabinets SAC 1581, SAC 1583, SAC 1587 and all associated light standards, foundations, conduits, conductors, and junction boxes.  
The westerly limits of the existing electrical system SAC 1587 is luminaire number 15 located on the north side of 41<sup>st</sup> St SE and west of I-5/41<sup>st</sup> St SE interchange.
- Design-Builder shall protect and maintain the existing lighting/underdeck illumination system that belongs to the City of Everett, located under I-5 at the 52<sup>nd</sup>/Lowell Rd and Smith Ave. vicinity. Any portions of said systems that are damaged or impacted by the Design-Builder's operation shall be repaired/replaced per City of Everett's requirements.
- Continuous illumination shall be installed for the following areas:
  - a. I-5 mainline LL STA 530+00 to LL STA 605+00
  - b. I-5 mainline LR STA 319+20 to LR STA 393+30
  - c. NB HOV Direct Access Off-ramp at Broadway from ER STA 10+00 to ER STA 19+00
  - d. SB HOV Direct Access On-ramp at Broadway from EL STA 10+00 to EL STA 19+00
  - e. NB right side Broadway Off-ramp from LR STA 343+00 to FR STA 31+00
  - f. NB 41st St On-ramp from GR STA 10+00 to GR STA 16+00
  - g. SB Broadway/41st Off-ramp from GL STA 10+00 to GL STA 18+00
  - h. SB Broadway/41st On-ramp from FL STA 10+00 to FL STA 17+40
  - i. Broadway area where NB HOV Direct Access Off-ramp, SB HOV Direct Access On-ramp, and NB Right side Broadway Off-ramp connecting to Broadway

**Pacific to Marine View Drive Interchanges**

- Design-Builder shall remove and replace existing electrical service cabinets SAC 1584, SAC 1585 and SAC 1586 and all associated light standards, foundation, conduits, conductors, and junction boxes.
- The existing navigational lighting system on the I-5 structures shall be located and reconnected to the new SAC 1586 service cabinet.
- Design-Builder shall protect and maintain the existing lighting/underdeck illumination systems that belong to the City of Everett located under I-5 at the Pacific Ave., Hewitt Ave. and Everett Ave. vicinity. Any portions of said systems that are damaged or impacted by the Design-Builder's operation shall be repaired/replaced per City of Everett's requirements.
- Design-Builder shall remove and replace all underdeck light fixtures and associated conduits, conductors, junction boxes and NEMA 4X junction boxes located at the I-5/SR 2 interchange vicinity.
- Continuous illumination shall be installed for the following areas:
  - a. I-5 mainline LL STA 605+00 to LL STA 695+00
  - b. I-5 mainline LR STA 393+30 to LR STA 483+70
  - c. SB SR 529/Pacific Ave On-ramp from HL STA 10+00 to HL STA 20+50
  - d. NB I-5: SR 529/Pacific Ave Off-ramp from I-5 LR STA 415+00 to HR STA 19+12
  - e. SB I-5: SR 2 On-ramp from IL STA 10+00 to IL STA 23+21.91. Underdeck lighting shall be provided under the Everett Ave structure for southbound I-5 to eastbound SR 2 ramp.
  - f. NB I-5 SR 2 Off-ramp from IR STA 10+00 to IR STA 22+20
  - g. SB I-5: SR2/Everett Ave Off-ramp from JL2 STA 10+00 to JL2 STA 23+00, JL1 STA 10+00 to JL1 STA 14+00
  - h. NB I-5: SR2/Everett Ave On-ramp from JR2 9+00 to JR2 STA 22+00, JR1 STA 15+00 JR1 21+00
  - i. SB I-5: Marine View Drive On-ramp from KL STA 10+00 to KL STA 17+80
  - j. NB I-5: Marine View Drive Off-ramp from KR STA 10+00 to KR STA 17+35
- Two existing light standards located on 23<sup>rd</sup> St undercrossing in the vicinity of I-5 (approx. LL Sta 680+50) shall be disconnected from WSDOT electrical service cabinet. Design-Builder shall install an electrical service cabinet per City of Everett standards and turn over to the City of Everett. The contact for the City of Everett is Souheil Nasr at (425) 257-7210.

**2.16.1.5 Power supply for Illumination Systems**

The Design-Builder shall install electrical service to provide power to all existing and proposed illumination systems including temporary illumination systems as required by the Contract Documents.

Except for highmast illumination systems, new service cabinets for illumination systems shall be Type E 240/480V single-phase services.

## 2.16.2 Mandatory Standards and Reference Documents

### 2.16.2.1 Mandatory Standards

**General.** Design-Builder shall design and construct the illumination system in accordance with the requirements of the Mandatory Standards listed in Table 2.16.1. The documents in Table 2.13.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than any of the listed Mandatory Standards, Design-Builder shall adhere to the standard identified in Design-Builders Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date** Use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.16.1**  
**Mandatory Standards for Illumination**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	N/A		Proposal
2	WSDOT	Design Manual for Design-Build Project	M22-02		RFP Appendix Z
3	WSDOT	Traffic Manual	N/A		
4	WSDOT	Illumination Design for Transportation Applications Manual	N/A		
5	WSDOT	Power Supply Design For Transportation Applications Manual	N/A		
6	WSDOT	Modifications to MUTCD	N/A		MUTCD
7	WSDOT	Amendments to the Standard Specifications	N/A		
8	WSDOT	Standard Specifications for Road, Bridge, and Municipal Construction	N/A		RFP Appendix B5
9		Manual on Uniform Traffic Control Devices (MUTCD)-WSDOT Modified	N/A		MUTCD

10		National Electric Code (NEC)	N/A		NEC
11		National Fire Protection Association (NFPA)	N/A		
12		All applicable State and local codes	N/A		
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					

### 2.16.2.2 Reference Documents

Design-Builder may use the Referenced Documents listed in Table 2.16.2 as supplementary guidelines for the design, provision, installation, and construction of the illumination improvements. These Referenced Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.16.2**  
**Reference Documents for Illumination**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	Information Guide to Roadway Lighting			
AASHTO	Roadway Design Guide			
	IES Roadway Lighting			

### 2.16.3 Performance Requirements

The Design-Builder shall design and construct all components of the roadway lighting systems (including temporary lighting system) necessary to provide complete and functional systems that meets the following performance requirements:

Light levels shall conform to the requirements of Section 840 of the WSDOT Design Manual For Design Build Projects (RFP Appendix Z). See Figure 840-6 for “Light Levels and Uniformity Ratios” Table.

In general the minimum average maintain horizontal light levels shall be as follows:

- Mainline and ramps: 0.6 foot-candles
- Ramp intersections: 0.9 foot-candles

Maximum Uniformity Ratio:

- Mainline and ramps: 4:1
- Crossroads and ramp intersections: 3:1

Maximum Veiling Luminance:

- All areas: 0.3:1

### **2.16.3.1 Software**

Lighting calculations utilizing AGI Lighting Design Software available from Lighting Analysts, Inc. Littleton, Colorado 303.972.8851 shall be submitted in hard copy and computer disc.

Photometric calculations shall be performed using the AGI 32 lighting program. It is not acceptable to use the Roadway Optimizer section of the AGI32 program for any part of the calculations. The illumination analysis shall be done in accordance with the most recent addition of the Illumination Design for Transportation Applications Manual provided by WSDOT. If the roadway environment includes obstructions (i.e. bridge decks, retaining walls, large trees or shrubs, etc.) that block any portion of the illuminance between the luminaire and the roadway, the illumination design shall be done in 3D with all of the obstructions accounted for in the calculations.

### **2.16.3.2 Meetings**

The Design-Builder shall work with WSDOT to form an Illumination design team to oversee and provide input on the illumination design and construction. The Illumination design team shall develop a schedule for meetings and coordination during the Project from the Notice to Proceed to Project Final Acceptance. These meetings may be reduced in frequency, as major illumination issues are resolved.

To monitor design progress and assist in the conduct of these meetings, the Design-Builder shall have available for review and inspection concept, interim and as available final plans showing all proposed locations for highway illumination components and how the equipment locations interrelate to form the highway illumination.

The Design-Builder shall schedule, organize, and conduct the Illumination Design progress meetings to accomplish the following:

- Review existing illumination systems and operations, including field verification of all existing illumination systems and components
- Define and finalize illumination functional, technical, operational, and maintenance requirements
- Finalize goals and parameters of illumination design
- Establish integration requirements
- Develop acceptance of the illumination design
- Address and discuss illumination construction issues

### **2.16.3.3 Design-Builder's Personnel**

See General Provisions Section 1-011.6 Design-Builder Personnel.

## **2.16.4 Design and Construction Criteria**

The Design-Builder shall be responsible for determining the number and location of the proposed illumination components required by Section 2.16.2.1 that are in addition to the required illumination elements listed in Section 2.16.1.2.

Where replacement of existing electrical system is called for in this RFP or other required specifications, the Design-Builder shall be responsible for the removal of the existing electrical facilities and installation of new electrical facilities in accordance with this RFP. New electrical facilities shall consist of furnishing, installing and testing all materials and equipment necessary for a complete and functional electrical system.

### **Clearance**

A minimum of ten feet distance (circumferential) shall exist between power lines including neutral wires and any illumination structure.

### **WSDOT Personnel**

The Northwest Region Electrical Inspector is responsible for compliance of electrical systems installed with WSDOT right of way. The Department of Labor and Industries has authority over all electrical installations within the State of Washington. The WSDOT has been granted authority over all electrical installations within the right of way of state highways, provided the Washington State DOT maintains and enforces an equal, higher or better standard of construction and of materials, devices, appliances and equipment than is required by state law. Design-Builder's QA Manager shall demonstrate compliance to the WSDOT Electrical Inspector that all electrical installations meet the requirements of the NEC and all applicable state law and provisions.

The Northwest Region Signal Maintenance Superintendent is Bryan Bailey. The Northwest Region Signal Maintenance Superintendent supervises the maintenance of all existing WSDOT signal, illumination and ITS facilities within the rights of way of state highways.

The Northwest Signal Maintenance Superintendent shall perform the following functions:

- Where called for in the Contract provide State supplied materials.
- Where called for in the Contract, receive salvaged electrical materials from Design-Builder.
- Performs oversight inspection of all Design-Builder installed electrical facilities prior to Physical Completion. (Before these electrical facilities are turned over to the State to maintain).
- Provide maintenance staffs for locates of existing WSDOT electrical facilities.

### **Maintenance Locate**

In addition to the other requirements for requesting locates, the Design-Builder shall provide the following when requesting WSDOT locates:

1. White paint or stakes at dig site.

2. Descriptions of area to be located with mile-post and land-marks.
3. Limited area per locate (1000 ft).

#### **2.16.4.1 Design Requirements**

The Design-Builder shall comply with WSDOT's current illumination policy and provide a complete set of roadway illumination Design Documents including, but not limited to:

- Required and continuous illumination including mainline as described in Section 2.16.1.3 and Section 2.16.1.4, entrance and exit gore areas, ramps, and crossroads.. Continuous illumination is not required for the full length of the project. Approximate limits of illumination.
- Sign Lighting.
- Existing electrical services shall be replaced for the new illumination systems.
- The Design-Builder shall design and construct the illumination system, giving due consideration to future maintenance. The illumination system shall be designed to minimize lane closures required for maintenance.
- Temporary illumination.

The Design-Builder shall design the electrical system using RFP Appendix B3.16.4, Technical Specifications Appendix B5 and the Master Details Appendix C3.16.

##### **2.16.4.1.1 Illumination Design Requirements**

The Design-Builder shall perform illumination calculations to support luminaire type, distribution, wattage, mounting height, spacing and service voltage to achieve the required design light level, including H1 height calculations (pole length) to achieve proposed mounting heights (height of light above the lighted surface). Design-Builder shall attach cross sections for review.

##### **2.16.4.1.2 Excavation and Backfilling**

See Section 8-20.3(2) of the WSDOT Standard Specifications.

##### **2.16.4.1.3 Foundations**

The Design Builder shall conduct a soils investigation for each highmast light standard location. Foundations for highmast light standards shall require soil analysis to determine the lateral bearing pressure, friction angle and water table. Existing highmast foundation shall not be reused. See Sections 2.6 - and Section 2.12 for additional requirements.

Design-Builder shall construct a 4'x4'x1' depth minimum concrete maintenance pad with minimum #4 bar 4" from the top at a maximum of 12" spacing in both direction integral with the highmast light standard foundation. The concrete pad shall be installed on the side of the lowering device/pole hand hole.

#### **2.16.4.1.4 Conduits**

Communication cable shall not be combined with illumination power circuits of any voltage under any circumstances. When communication cable is installed as part of a new system, the communication cable shall be kept separate from all other wiring.

Illumination circuits may share a junction box with other circuits, including traffic signal detection and display circuits, provided that all circuits in the junction box are energized from the same service. When modifying an existing traffic signal, the installation of separate illumination conduits might be impracticable. In these situations, the illumination circuit conductors may be installed in the signal circuit conduit. When considering this, Design-Builder shall verify that all conductors in the conduit have an insulation rating equal to or exceeding the maximum circuit voltage applied to any conductor within that raceway. Ratings for various types of insulation are contained in the National Electrical Code. When communication cable is installed within the limits of an existing signal system, the communication cable shall be kept separate from all other wiring, with the exception that it may be combined with signal power circuits which are 120 volts or less, such as a five conductor for signal heads. If possible, however the communication cable should be kept separate.

In new conduits, conductors shall occupy a maximum 26% of the cross-sectional area of the conduit. In existing conduits, conductors fill shall meet NEC requirement for conduit with three or more conductors, conductors shall occupy a maximum of 40% of the conduit's area. The minimum size conduit for illumination installations is 1-1/2 in diameter. Exception: 1 in diameter conduit is required between a standard light standard and the first junction box. The minimum size conduit for installation under a roadway is 2 in diameter.

All proposed conduits placed under existing pavement shall be installed by jacking, drilling, directional boring, or by boring and casing.

The Design-Builder shall not open cut trench existing paved surfaces. Exception: Open trenching to install conduits may be allowed prior to the installation of new sub base and pavement installed for the purpose of paving a roadway section. The new pavement limits shall encompass the limits of open cut trenching. The Design Builder shall consult with WSDOT prior to open cut trenching.

#### **Conduit In Structures**

The Design-Builder shall install a minimum of two separate raceway systems in all new structures, walls, and barriers. See Appendix C2.16. Each raceway system shall consist of a 2" (minimum) conduits run with associated NEMA 4X junction boxes and conduit expansion/deflection fittings. The two raceway systems shall not share junction boxes. The conduit raceway systems shall transition and exit the structures, walls, and barriers and terminate in separate type 1(minimum) junction boxes located in grade. For bridge structures the double raceway system shall be installed in the barrier on both sides of the bridge.

The Design Builder shall install a junction box in the structure, within 40 feet of each end of the structure, for each raceway system. For bridges junction boxes shall be installed centered

between the second and third dummy joints from each end of the bridge. The maximum spacing for junction boxes in bridge rail is 180 feet within each raceway system. Any surface mounted conduits on existing structure shall be installed with expansion/deflection fittings. The method of installation shall be approved by WSDOT Bridge Office.

### **Spare Conduits**

The Design-Builder shall install a spare 2" conduit associated with every conduit crossing under pavement. The Design-Builder shall install a spare 2" conduit between the service and the first junction box.

The design builder may use existing conduit located in or on existing structures if they can demonstrate;

1. Existing conduits are structurally acceptable.
2. Use of existing conduits meets all requirements of 2.16.4.1.4.
3. Junction boxes & conduit runs are accessible outside of mainline traffic.

### **2.16.4.1.5 Junction boxes**

Where possible junction boxes shall be located out of paved areas and sidewalks. Any junction boxes located within paved areas shall be Heavy Duty Type 4, 5 or 6. See details in RFP Appendix C. The Design-Builder shall consult with WSDOT when considering installation of Heavy Duty Junction Boxes.

Junction boxes located out of paved areas shall be Type 1, 2 and 7. See standard plans and details in RFP Appendix C.

Junction boxes shall be installed within a nominal 5 feet and maximum 10 feet from each light standard.

Standard WSDOT junction boxes shall be sized in accordance with the Standard Plans and this RFP. All other junction boxes shall be sized for #4 or greater conductors in accordance with the WSDOT Power Supply Design for Transportation Applications Manual and the National Electric Code.

### **2.16.4.1.6 Wiring**

All permanent wiring shall be installed in conduit raceway systems. Direct buried wiring or cables shall not be permitted. The permanent electrical raceway system shall be installed underground, on or within structures. Aerial wiring is only permitted for temporary electrical systems.

Copper conductors are required for all permanent underground illumination circuits. Aluminum conductors may be used for temporary overhead illumination circuits. The conductor type installed between the utility power source and the service cabinet shall be copper meeting serving utility company requirements. The minimum conductor size for illumination circuits is a #8 AWG (American Wire Gage). Diameters, areas, ampacities, and resistance factors for various conductor sizes are shown in Figure 840-8.

The allowable line loss for illumination circuits is 5%. A 10% line loss is allowed for temporary illumination circuits. Line loss shall be calculated in accordance with the WSDOT Power Supply Design for Transportation Applications Manual using the following formula:

$$\text{Voltage Drop} = 2ALR.$$

Where: A = Current in amps, L = Length of conductors, R = Resistance of the conductor

#### **2.16.4.1.7 Bonding, Grounding**

All metallic junction box lids shall be grounded, including any existing junction boxes that are to remain. See RFP Appendix B.

#### **2.16.4.1.8 Electrical services**

Highmast illumination shall be powered by Modified, Type E, 277/480 volts, three phase electrical services. See Appendix C2.16. All three-phase conductors shall be routed to each highmast light standard.

Conventional illumination shall be powered by Modified, Type E, 240/480 volts, single-phase electrical services.

Standard service cabinet installations shall provide a minimum of two lighting circuits for Type B Services and minimum of five circuits for Type D , E, or Modified E Services.

The Design-Builder shall provide separate circuits for each approach at intersections and at each ramp and the crossroad at interchanges.

Underground service laterals shall be provided between the utility power source and the service cabinet. Power feed conductors, from the utility transformer to the service, shall be isolated from other circuits by using a separate conduit. Junction boxes in this conduit run are not allowed. Service connections shall meet serving utility company requirements.

Service breaker sizes shall be sized in accordance with the Power Supply Design for Transportation Applications Manual and the National Electrical Code. Branch breakers shall be at least 140% of the computed illumination circuit load. The breaker size shall not exceed the ampacity of the smallest conductor it protects. The #10 pole and bracket cable is protected by fusing and is not a consideration in this sizing requirement. The size of the main breakers shall not exceed 140% of all of the computed illumination loads and 125% of all other loads on the service. The minimum main breaker size shall be a minimum 200 amps. The service lateral conductors shall be sized to the serve the full load of the electrical bus work.

Lighting contactors shall be equal or exceed the branch breaker rating for the circuit it switches.

Control Equipment. Photoelectric control devices and time clocks are used to control illumination circuits. The photoelectric control shall be provided in electrical service cabinet for all illumination systems.

Other locations, such as tunnels with daytime lighting, require special controls. Controls are provided for circuits that energize certain fixtures throughout the day and night. Other controls energize additional fixtures to provide minimum daytime light levels, entrance zone light levels, and any subsequent zone lighting.

Service cabinets shall meet Electric Utility Service Equipment Requirement Committee (EUSERC) standards. Service cabinets shall be in accordance with standard plans J3b, J3c and J3d (RFP Appendix C). WSDOT Type A or C service cabinets shall not be installed.

The Design-Builder shall coordinate with WSDOT and submit the necessary design information for new and modified electrical services. WSDOT NWR Utility Section will obtain any Service Agreements from the public utility company. The time required for WSDOT to obtain the service agreement once the Design-Builder submits the required information will be 21 calendar days. The Design-Builder shall pay all costs charged by the electric power companies for providing power connections. The WSDOT shall pay the monthly electric bills starting on the day Work begins for the existing lighting and lighting installed under the Contract until Final Acceptance of the Project.

#### **Location of Electrical Service**

Electrical services shall be installed within WSDOT Right-of-Way. Electrical services shall be located outside of the clear zone (per the *Roadside Design Guide*) and in an area where access to equipment shall not affect traffic operations nor require maintenance of traffic. With WSDOT approval, the Design-Builder may install electrical services within the clear zone. Electrical services installed in the clear zone shall be installed behind barrier, guardrail, or crash protection equipment.

Electrical services shall be located to provide access for maintenance and serving utility companies. The Design-Builder shall install an access gate in existing fence lines where required for access to service cabinets.

Electrical services shall not be installed in ditches, or on steep slopes.

The Design-Builder shall consult with WSDOT on electrical service location.

#### **2.16.4.1.9 Testing**

See RFP Appendix B3.16.

#### **2.16.4.1.10 Illumination**

The illumination systems shall be designed with due consideration of roadway safety, ease and cost of maintenance, consistency with adjacent roadway lighting designs, and provision for future lighting needs.

Illumination systems shall operate on 480 volts, single phase, except highmast illumination, as noted in Section 2.16.4.8.

Highmast light standards shall be a minimum of 70 feet and a maximum of 110 feet in length. Holophane LD5 fixture lowering devices shall be installed at each pole. Two remote control units for the entire highmast light standard system to operate the lowering device shall be provided. Highmast luminaires shall be maximum eight fixtures clustered with 400 watts HPS open bottom Type V distribution.

All highmast light standards shall be located behind barrier in accordance with the barrier's deflection requirements.

Conventional light standards shall be 40 or 50 feet in length. Luminaires on conventional light standards shall have a maximum mounting height of 55 feet. All conventional light standards shall be installed on slip base except for those that are located behind 3 feet minimum behind guardrail, or on walls or barrier.

Conventional luminaires shall be flat lens, HPS, Type III, medium cut off distribution.

The Design-Builder shall design the illumination system to meet the light level requirements contained in WSDOT Design Manual For Design Build Projects Chapter 840 (Illumination). This Work shall include calculation for Light Level, Uniformity and Veiling Luminance. These calculations are used to determine the spacing of the luminaires to illuminate the design area. The Design-Builder shall use AGI software as listed in Section 2.16.3.1

Illumination shall be shielded where requested by adjacent local businesses or residents.

### **Temporary Illumination**

Temporary illumination shall be furnished and installed per current WSDOT Design Standards For Design-Build Projects (RFP Appendix Z) and WSDOT Standard specifications prior to the removal of the existing illumination systems. Temporary illumination for Required Illumination specified in Section 840.04 of the Design Manual for Design-Build Projects shall be installed and maintained for all existing, temporary and final channelization when the permanent illumination systems have not been installed and operational and the existing illumination system is removed.

Temporary Continuous Illumination shall be installed and maintained where required.

Temporary illumination shall also be provided for temporary channelization or traffic control under the following conditions:

- Lanes are less than 11' wide.
- There is less than 1 foot shy to barrier.
- Traffic splits in channelization
- Abrupt changes in lane alignment.
- Lane shifts

- At tapers and transitions
- Narrowing of lanes.

The Design Builder shall submit temporary lighting plans for all temporary lighting installations. The Design-Builder shall consult with WSDOT for temporary lighting limits.

#### **2.16.4.1.11 Photometric Analysis**

The Design-Builder shall complete and submit a Photometric Analysis Report that includes but is not limited to the following:

1. Average maintained horizontal light level, maximum uniformity ratio, and maximum veiling luminance for each design area and direction of travel.
2. Luminaire locations with mounting heights, luminaire types, wattage and quantities of each.
3. Use a grid point spacing of 5 feet with two decimal points in both X and Y directions for all illuminance, luminance and veiling luminance calculations.
4. Lighting calculations accounting for the anticipated loss of light due to lamp lumen depreciation (LLD) and lamp dirt depreciation (LDD) shall be 0.62.
5. A graphical print of all design areas with calculation points. Prints shall be legible and scaleable. The report shall list all photometric files, luminaire definitions and their characteristics.
6. All calculated photometric values with supporting calculations printout including graphical prints showing the precise location and/or design areas of these values and their sources.
7. The Design-Builder shall explain any unusual design areas.
8. All requirements set forth in the Final Environmental Impact Statement (FEIS)

#### **2.16.4.1.12 Lighting Under Structures**

Provide illumination of tunnels, underpasses or lids if portal conditions result in a brightness in the tunnel that is less than the measured daytime brightness of the approach roadway divided by 15 and the length to vertical clearance ratio is 10:1 or greater. Lighting fixtures under structures shall be underdeck, wall mount, Wall pack type, lighting fixtures as shown in the WSDOT Illumination Design for Transportation Applications Manual.

The Design-Builder shall submit three dimensional aspects analysis of the roadway with respect to the positioning of the illumination assemblies for underpasses.

#### **2.16.4.1.13 Spillover Light**

The illumination systems shall be designed to limit the spillover lighting on adjacent properties.

#### **2.16.4.1.14 Salvage**

The Design-Builder shall salvage lighting fixtures, steel light standards, in accordance with Appendix B 2.16. The Design-Builder shall remove and dispose of all concrete light standard bases.

### **2.16.4.2 Construction Requirements**

#### **2.16.4.2.1 General**

##### **Existing Utilities**

The Design-Builder shall be responsible for locating and marking all underground utilities prior to any electrical installation Work. The Design Builder may ask WSDOT for assistance in locating WSDOT facilities.

#### **2.16.4.2.2 Illumination System**

The illumination system shall be constructed in accordance with RFP Appendix B3.16.4 “Illumination, Traffic Signal Systems, and Electrical”, Appendix B5 and Master Details Appendix C3.16.

##### **Navigational Lights**

The Design Builder shall keep in operation at all times existing navigational lighting system on the I-5 structures connected to existing Electrical Service SAC 1586.

### **2.16.5 Submittals**

#### **2.16.5.1 Permanent Illumination Concept Plan**

The Design-Builder shall develop a Permanent Illumination Concept Plan for the Project that includes all necessary lighting for the project in accordance with the RFP requirements.

The Permanent Illumination Concept Plan shall include as a minimum, the following:

1. Light standard locations
2. Service cabinet locations
3. Conduit routing
4. Luminaire Schedule
5. Existing overhead and under ground utilities.

6. Proposed channelization
7. Legend

### **2.16.5.2 Released for Construction (RFC) Documents**

The Design-Builder shall provide an Illumination Plan for each ramp/roadway section as described in the Section 2.16.4.1. WSDOT will respond within 10 Working Days of receipt of each Illumination Plan. The plan submittal shall include the following:

Design Summary: This summary shall identify and document Roadway Classification, Area Classification, and Design Light Level requirements. The summary shall also identify the deficiencies of the existing system and proposed mitigation, impacts to the existing system due to Site preparation or other proposed Work.

Photometric Analysis Report as described in Section 2.16.4.1.11.

The Design-Builder shall provide illumination calculations to support luminaire type, distribution, wattage, mounting height, spacing and service voltage to achieve the required design light level, including H1 height calculations (pole length) to achieve proposed mounting heights (height of light above the lighted surface). Design-Builder shall attach cross sections for review. The Illumination Plan shall have the following items:

1. Title sheet, north arrow and scale bar.
2. Legend of symbols.
3. Existing electrical features.
4. Proposed channelization.
5. Luminaire pole locations.
6. Power source and service locations.
7. Luminaire Schedule.
8. Conduit runs and junction box location.
9. All existing and proposed overhead and under ground utilities.
10. Luminaire type, distribution, wattage.
11. Luminaire spacing.
12. Mounting height and H1 height
13. Service voltage
14. Conductor schedule.
15. Breaker Schedule
16. Construction notes
17. Applicable Illumination Details

In addition to the items listed above, engineering backup data to support the illumination design shall be submitted. Engineering backup data shall include the following items:

1. Voltage drop calculations.

2. Calculations to support transformer sizing, and transformer overcurrent protection devices.
3. Conduit fill and junction box capacity calculations.
4. Service load calculations.
5. Permission from bridge for attachment to structures
6. Soils information for foundation design.
7. Structural calculations for foundations and structural attachments.
8. Illumination calculations to support luminaire type, distribution, wattage, and spacing
9. Mounting height and H1 height calculations to achieve proposed mounting heights.
10. Cross sections shall be attached for review.
11. Electrical load calculations and line loss calculations to support breaker, wire and lighting contactor sizing.
12. Load balancing for three phase services
13. Utility agreement requests
14. Utility relocation requests
15. Applicable agreements or permits.

### **2.16.5.3 As-Built Plans**

The Design-Builder shall submit As-Built Plans, product manuals and shop drawings for the illumination system after construction is complete. Final Acceptance will not be granted until this material is submitted.

## **2.17 SIGNALS**

### **Abbreviations**

EVP Emergency Vehicle Pre-emption

### **2.17.1 General**

The Design-Builder shall perform all Work necessary to meet the requirements for the traffic signal system in accordance with the Contract Documents, including standards and publications, performance requirements, design and construction criteria, warranty of Work, maintenance during construction, and submittals are covered herein.

The elements of the traffic signal system shall include but not limited to the following:

- Signal standards and mast arms
- Luminaires on signal standards
- Foundations
- Vehicle and pedestrian heads
- Emergency vehicle preemption detectors
- Terminal cabinets
- Junction boxes
- Conduits and wirings
- Temporary video detection system
- Temporary traffic signal system

- Induction loops
- Traffic control cabinet and associated equipment
- Signal interconnect

**Core Devices**

The following subsections contain the proposed locations of the core signal elements that shall be included with the Design-Builder's Proposal.

The Design-Builder shall be responsible for determining the number and location of proposed signal elements required by Section 2.17.2.1 that are in addition to the core signal elements.

WSDOT will consider proposals that relocate the core signal, provided the same level of functionality is obtained.

**Signal Rebuilds**

The Design-Builder shall replace the traffic signal system located at the SR 526/S. Broadway Avenue intersection.

- The existing signal controller cabinet, transformer cabinet and the induction loop system shall remain and be incorporated into the new traffic signal system.

**Signals**

The Design-Builder shall install a steel mast arm signal system and associated equipments located at the Southbound I-5 Offramp and 41<sup>st</sup> Street SE intersection. The major components of this signal system are:

- Signal standards and foundations for vehicle displays and pedestrian displays.
- Hardwire interconnected using fiber optics cable with the existing signal system located at the I-5 Northbound Onramp and 41<sup>st</sup> Street SE intersection.
- Signal controller cabinet with 2070 controller and Nextphase software.
- Vehicle induction loops and pedestrian detection systems.
- Illumination for the intersection (see Section 2.16 – Illumination).

**Power supply for Signal systems**

The Design-Builder shall install electrical services to provide power to all existing signal systems and proposed signal systems pursuant to the Contract Documents.

The Design-Builder shall remove the existing pole mounted type A service cabinet SAC 2123. The Design-Builder shall provide power from the new electrical service SAC 1231 via 480V/120V transformer to the existing signal system located at the I-5 NB off ramp/SR 527 intersection.

For additional requirements see Section 2.16 (Illumination).

**Maintenance During Construction.** Design-Builder shall maintain the traffic signal system during construction in accordance with the requirements in Section 2.27(Maintenance During Construction).

## 2.17.2 Mandatory Standards and Referenced Documents

### 2.17.2.1 Mandatory Standards

**General.** Design-Builder shall design and construct the Signals system in accordance with the requirements of the Mandatory Standards listed in Table 2.17.1. The documents in Table 2.17.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in the Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than any of the listed Mandatory Standards, Design-Builder shall adhere to the standards identified in Design-Builders Proposal.

**Ambiguity.** If there is any unresolved ambiguity in Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date** Use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.17.1**  
**Mandatory Standards for Signals**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	N/A		Proposal
2	WSDOT	Design Manual for Design-Build Project	M22-02		RFP Appendix Z
3	WSDOT	Traffic Manual	N/A		
4	WSDOT	Illumination Design for Transportation Applications Manual	N/A		
5	WSDOT	Power Supply Design for Transportation Applications Manual	N/A		
6	WSDOT	Modifications to MUTCD	N/A		MUTCD
7	WSDOT	Amendments to the Standard Specifications	N/A		RFP Appendix B4
8	WSDOT	Standard Specifications for Road, Bridge, and Municipal Construction	N/A		RFP Appendix B5
9		Manual on Uniform Traffic Control Devices (MUTCD)-WSDOT Modified	N/A		MUTCD

10		National Electric Code (NEC)	N/A		NEC
11		National Fire Protection Association (NFPA)	N/A		
12		All applicable State and local codes	N/A		
** Only to the extent the Proposal requirements exceed the requirements of all other Mandatory Standards.					

### 2.17.2.2 Referenced Documents

Design-Builder may see the Referenced Documents listed in Table 2.17.2 as supplementary guidelines for the design, provision, installation, and construction of the traffic signals system. These Referenced Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.17.2**  
**Reference Documents for Signals**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
	ITE Manual of Traffic Signal Design			
	TRB Highway Capacity Manual			
* If no date is given, the most current version as of the initial publication date of this RFP is specified.				

### 2.17.3 Performance Requirements

The Design-Builder shall design and construct all components of a traffic signal system necessary to provide a complete and functional system that meets the following performance requirements:

- Optimize traffic flows and minimize delay.
- Coordinate with adjacent intersections and arterial roads.
- Accommodate pedestrians.
- To function safely.

### 2.17.4 Software

2070 Nextphase controller software shall be installed at the new signal controller installations located at the Southbound I-5 Offramp/41<sup>st</sup> Street SE intersection.

### 2.17.5 Meetings

The Design-Builder shall work with WSDOT to form a signal design team to oversee and provide input on the signal design and construction. The signal design team shall develop a schedule for meetings and coordination during the Project from the Notice to Proceed to

Project Final Acceptance. These meetings may be reduced in frequency, as major signal issues are resolved.

To monitor design progress and assist in the conduct of these meetings, the Design-Builder shall have available for review and inspection concept, interim and as available final plans showing all proposed locations for highway signal components and how the equipment locations interrelate to form the highway signal.

The Design-Builder shall schedule, organize, and conduct the signal Design progress meetings to accomplish the following:

- Review existing signal systems and operations, including field verification of all existing signal systems and components
- Define and finalize signal functional, technical, operational, and maintenance requirements
- Finalize goals and parameters of signal design
- Establish integration requirements
- Develop acceptance of the signal design
- Address and discuss signal construction issues

#### **2.17.6 Design-Builder's Personnel**

See General Provisions Section 1-011.6.

#### **2.17.7 Design and Construction Criteria**

The Design-Builder shall be responsible for determining the number and location of the proposed signal components required by Section 2.17.2.1 that are in addition to the required illumination elements listed in Section 2.17.1.

Where replacement of existing electrical system is called for in this RFP or other required specifications, the Design-Builder shall be responsible for the removal of the existing electrical facilities and installation of new electrical facilities in accordance with this RFP. New electrical facilities shall consist of furnishing, installing and testing all materials and equipment necessary for a complete and functional electrical system.

#### **Clearance**

A minimum of ten feet distance (circumferential) shall exist between power lines including neutral wires and any signal structure.

#### **WSDOT Personnel**

The Northwest Region Electrical Inspector is responsible for compliance of electrical systems installed with WSDOT right of way. The Department of Labor and Industries has authority over all electrical installations within the State of Washington. The WSDOT has been granted authority over all electrical installations within the right of way of state highways, provided the Washington State DOT maintains and enforces an equal, higher or better standard of construction and of materials, devices, appliances and equipment than is

required by state law. Design-Builder's QA Manager shall demonstrate compliance to the WSDOT Electrical Inspector that all electrical installations meet the requirements of the NEC and all applicable state law and provisions.

The Northwest Region Signal Maintenance Superintendent is Bryan Bailey. The Northwest Region Signal Maintenance Superintendent supervises the maintenance of all existing WSDOT signal, illumination and ITS facilities within the rights of way of state highways.

The Northwest Signal Maintenance Superintendent shall perform the following functions:

- Where called for in the Contract provide State supplied materials.
- Where called for in the Contract, receive salvaged electrical materials from the Design-Builder.
- Performs oversight inspection of all Design-Builder installed electrical facilities prior to Physical Completion. (Before these electrical facilities are turned over to the State to maintain).
- Provide maintenance staffs for locates of existing WSDOT electrical facilities.

#### **Maintenance Locate**

In addition to the other requirements for requesting locates, the Design-Builder shall provide the following when requesting WSDOT locates:

4. White paint or stakes at dig site.
5. Descriptions of area to be located with mile-post and land-marks.
6. Limited area per locate (1000 ft).

### **2.17.7.1 Design Requirements**

The Design-Builder shall make provisions and provide necessary materials for intersection lighting as part of any new signal system. The Design-Builder shall provide all necessary emergency vehicle pre-emption (EVP) wiring for all permanent signal system installations. The Design-Builder shall wire all signals for pedestrian push buttons. For new permanent signal systems, the Design-Builder shall include LED signals for all vehicle and pedestrian signal indications. The Design-Builder shall provide optically programmed or louvered signal heads when necessary to avoid driver confusion. The Design-Builder shall seek the assistance of WSDOT on when to use optically programmed signal heads. All vehicle signal heads shall have louvered aluminum back plate installed by the Design-Builder.

The Design-Builder shall design the electrical system using RFP Appendix B3.16.4, Technical Specifications Appendix B5 and the Master Details Appendix C3.16.

#### **2.17.7.1.1 Permanent Signals**

Traffic signals shall be designed using the following criteria:

- A. The traffic signal standards shall be steel pole and mast arm type.
- B. Signals shall be furnished and installed per current WSDOT Design Manual For Design Build Projects Chapter 850 and WSDOT Standard specifications.

- C. The Design-Builder shall furnish and install all signal equipment. All signal equipment shall be new and conform to WSDOT standards and specifications
- D. The Design-Builder shall install temporary video detection for stop bar loop locations and advance loop locations prior to existing induction loops disconnection. No down time will be allowed.
- E. The existing traffic signal system shall be kept operational at all times. The Design-Builder shall install a temporary traffic signal system if any portion of the existing signal system has to be removed prior to when the new traffic signal system is operational.

#### **2.17.7.1.2Excavation and Backfilling**

See Section 8-20.3(2) of the WSDOT Standard Specifications.

#### **2.17.7.1.3Foundations**

The Design Builder shall conduct a soils investigation for each signal standard location. Foundations for signal standards shall require soil analysis to determine the lateral bearing pressure, friction angle and water table. Existing signal foundation shall not be reused. See Sections 2.6 - and Section 2.12 for additional requirements.

#### **2.17.7.1.4Conduits**

This section shall be in accordance with Section 2.16 “Conduits.”

#### **2.17.7.1.5Junction boxes**

This section shall be in accordance with Section 2.16 “Junction boxes.”

#### **2.17.7.1.6 Wiring**

- Design-Builder shall use (1) seven-conductor cable for a dual pedestrian display from the signal controller cabinet to the terminal cabinet located on signal pole.
- Design-Builder shall use (1) five-conductor cable for each single vehicle and pedestrian display.
- Design-Builder shall use two-conductor (shielded) cable for each pedestrian detector.
- Design-Builder shall use three-conductor (shielded) cable for each emergency vehicle preemption detector.

#### **2.17.7.1.7 Bonding, Grounding**

This section shall be in accordance with Section 2.16 “Bonding, Grounding.”

#### **2.17.7.1.8Signal heads**

- Design-Builder shall maintain a minimum 8 feet between all signal displays for a given approach.
- Design-Builder shall use 12-inch signal lenses
- Design-Builder shall use type M mounting as practical for all vehicle heads.
- LED signal heads shall be installed for all vehicle and pedestrian signal indications.
- All arrow displays for left turn signal shall be used for protected only operation.
- Design-Builder shall use directional, extended visors for appropriate signal displays at a skewed intersection. The intent is to shield visibility of signal displays, which could be seen by drivers on an approach for which the displays are not intended. When directional visors are installed for displays supported on a span wire, a tether shall be used to stabilize and maintain proper orientation of the directional visors.

#### **2.17.7.1.9 Signal Standards**

- Design-Builder shall locate signal poles behind sidewalks.
- Type 2 and type 3 signal poles shall have terminal cabinet with a spare 12-position terminal.

#### **2.17.7.1.10 Induction Loop Vehicle Detectors**

Placement of advanced loops shall be in accordance with Appendix C 3.16 “Northwest Region Placement of Advanced Loops”.

Induction loop numbering shall be in accordance with Appendix C 3.16 “Northwest Region Standard Loop Numbering”.

Existing induction loops shall be incorporated into the rebuild signal system.

### **2.17.7.2 Construction Requirements**

#### **2.17.7.2.1 General**

##### **Maintenance Responsibility**

The Design-Builder shall maintain existing traffic signals for the duration of the Project. The Design-Builder shall be responsible for maintaining all signals and components identified for modification at the commencement of construction activities. The date of commencement of construction will be set or announced at the Project Preconstruction Meeting. The Design-Builder shall retain maintenance responsibility for all devices until it has completed all work through final acceptance of the Project.

##### **Existing Utilities**

The Design-Builder shall be responsible for locating and marking all underground utilities prior to any electrical installation Work. The Design Builder may ask WSDOT for assistance in locating WSDOT facilities.

#### **2.17.7.2.2 Signal System**

The Design-Builder shall construct all components of a traffic signal system necessary to provide a complete and functional system that meets the performance requirements specified in RFP Appendix B3.16.4 Technical Specifications Appendix B5 and the Master Details Appendix C3.16.

#### **Test for Induction Loops and Lead-in Cable**

See RFP Appendix B3.17.

#### **2.17.7.3 Operation**

WSDOT will provide signal timing for temporary, revised, and permanent signals. WSDOT will enter the timing parameters into the signal controller. WSDOT will be responsible for the operation of the signal controllers and signal controller cabinets for the identified permanent, revised, and temporary signals.

#### **2.17.7.4 Emergency Maintenance**

Notification of a trouble call will come from the Northwest Region Transportation System management Center (TSMC). The Design-Builder shall be on Site working on the trouble call within 2 hours of notification by TSMC. Failure to respond within this time frame will cause WSDOT Signal Branch Office to respond to the problem at the Design-Builder's expense. (This arrangement could be set up in advance if all parties are willing to prevent delays in response to trouble calls.) Any Work by WSDOT will be limited to correcting the trouble call and will not result in acceptance of any work by the Design-Builder.

#### **2.17.8 Submittals**

##### **2.17.8.1 Shop Drawings**

Shop drawings and product data shall, at a minimum, include the following:

- Poles, mast arms (by type and size), and pedestals
- Service cabinets
- Luminaires and lamps
- Ballasts and photoelectric controls
- Paint (prime and finish)
- Fuse holder kits, fuses, and insulating boots
- Loop detector splice kits

- Vehicle signal indications and lenses
- Pedestrian signal indications, lenses, and housings
- EVP equipment

### **2.17.8.2 Preliminary Signal Plan**

The Design-Builder shall develop a preliminary signal plan in accordance with the requirements of Section 850.06(10) of the Design Manual for Design Build Project.

### **2.17.8.3 Released for Construction (RFC) Documents**

The Design-Builder shall provide a Signal Plan for each intersection as described in the Section 2.17.1. WSDOT will respond within 10 business days of receipt of each Signal Plan. The plan submittal shall include the following:

The Design-Builder shall provide illumination calculations to support luminaire type, distribution, wattage, mounting height, spacing and service voltage to achieve the required design light level, including H1 height calculations (pole length) to achieve proposed mounting heights (height of light above the lighted surface). Design-Builder shall attach cross sections for review.

The Signal Plan shall have the following items:

1. Title sheet, north arrow and scale bar.
2. Legend of symbols.
3. Existing electrical features.
4. Proposed channelization including lane geometry and intersection layout for all approaches.
5. Phasing diagram
6. Signal pole locations Signal head locations and schedule.
7. Ped head locations and schedule.
8. Type and location of detection
9. Pole and conductor schedule
10. Existing induction loop location.
11. Luminaire pole locations.
12. Power source and service locations.
13. Luminaire Schedule.
14. Conduit runs and junction box location.
15. All existing and proposed overhead and under ground utilities.
16. Luminaire type, distribution, wattage.
17. Luminaire spacing.
18. Mounting height and H1 height
19. Service voltage
20. Conductor schedule.
21. Breaker Schedule
22. Construction notes
23. Applicable Illumination Details

In addition to the items listed above, engineering backup data to support the illumination design shall be submitted. Engineering backup data shall include the following items:

1. Signal display height clearance and placement calculations.
2. All supporting traffic and speed studies. Speed study shall include data indicating 90<sup>th</sup>, 85<sup>th</sup> and 10<sup>th</sup> percentile speeds for all approaches.
3. Peak hour turning movement counts (a.m., midday, and p.m.)
4. Loop placement calculations based on the WSDOT Northwest Region Method. Phasing analysis to support protected or protected-permitted left-turn phasing. If protected-permitted left-turn phasing is planned, provide verification that conditions are suitable for this type of operation.
5. Windload calculations for signal mast arms for proposed and future phasing conditions to support foundation sizing. Attach soils analysis for each signal standard to verify foundation design. Attach back up design data for all special designs. In the case of span wire installations, strain pole class and foundation selection calculations are required to support the design.
6. Voltage drop calculations.
7. Calculations to support transformer sizing, and transformer overcurrent protection devices.
8. Conduit fill and junction box capacity calculations.
9. Service load calculations.
10. Permission from bridge for attachment to structures
11. Geotech information including soils information for foundation design.
12. Structural calculations for foundations and structural attachments.
13. Illumination calculations to support luminaire type, distribution, wattage, and spacing
14. Mounting height and H1 height calculations to achieve proposed mounting heights.
15. Cross sections shall be attached for review.
16. Electrical load calculations and line loss calculations to support breaker, wire and lighting contactor sizing.
17. Load balancing for three phase services
18. Utility agreement requests
19. Utility relocation requests
20. Applicable agreements or permits.

#### **2.17.8.4 As-Built Documentation**

The Design-Builder shall submit As-Built Plans, product manuals and shop drawings for the signals system after construction is complete. Final acceptance will not be granted until this material is submitted.

## 2.18 INTELLIGENT TRANSPORTATION SYSTEM (ITS)

### 2.18.1 General

#### 2.18.1.1 Abbreviations

bps	Bits Per Second of Serial Data
CAM	Camera
CCTV	Closed Circuit Television
CC	Camera Cabinet
CPU	Central Processing Unit
CWDM	Course Wave Division Mutiplex
dB	Decibel
dBm	Decibel referenced to 1 milliwatt
DS	Data Station
DS-1	Digital Signal Level 1 (1.544 Mbits/s)
DS-3	Digital Signal Level 3 (44.736 Mbits/s)
ES	Electronic Surveillance
EPROM	Electronically Programmable Read-Only Memory
FM	Frequency Modulation
HAR	Highway Advisory Radio
HARS	Highway Advisory Radio Sign
HART	Highway Advisory Radio Transmitter
ITS	Intelligent Transportation System
Kbps	Thousands of Bits Per Second of Serial Data
LASER	Light Amplification by Stimulated Emission of Radiation
LED	Light Emitting Diode
Mbps	Millions of Bits Per Second of Serial Data
MMFO	Multimode Fiber Optics
MUX	Multiplexer
nm	Nanometer (10 <sup>-9</sup> meter)
OC-1	Optical Carrier Level 1 (50.84 Mbits/s)
OC-12	Optical Carrier Level 12 (622.08 Mbits/s)
OC-48	Optical Carrier Level 48 (2.44 Gbits/s)
OFNR	Optical Fiber Nonconductive Riser
OSP	Outside Plant
OTDR	Optical Time Domain Reflectometer
PTZ	Pan, Tilt, Zoom (for camera control)
RGB	Red, Green, Blue video signals
RMU	Rack Mounting Unit (1.75 inches)
SC&DI	Surveillance, Control and Driver Information
SMFO	Singlemode fiber optics
SONET	Synchronous Optical Network
STS-1	Synchronous Transport Signal Level 1 (electrical 50.84 Mbits/s)
T1	See DS-1
T3	See DS-3
TC	Terminal Cabinet

TDM	Time Division Multiplex
TMS	Traffic Management System
TSMC	Traffic Systems Management Center
TWP	Twisted Wire Pair
UPS	Uninterruptible Power Supply
VMS	Variable Message Sign
WSTA	Weather Station
ZIF	Zero-Insertion Force

### **2.18.1.2 General**

The Design-Builder shall conduct all Work necessary to meet the requirements for ITS in accordance with the Contract Documents, including standards and documents, performance requirements, design and construction criteria, warranty of Work, maintenance during construction, and submittals are covered herein.

The Design-Builder shall design, furnish, install, and test all materials and equipment for a fully operational system that includes the ITS devices described in this Section. For each of these devices, the Design-Builder shall be responsible for making all wiring and cabling connections to provide both local and remote operation from the TSMC. The Design-Builder shall be responsible for making all equipment, wiring, and cabling connections to provide continuous communications to both the ITS devices and the TSMC.

The Design-Builder shall be responsible for ITS fiber infrastructure in all areas that the Design-Builder works. This may include areas outside the Project limits.

The Design-Builder shall be responsible for:

1. Maintaining communications to all ITS devices and centers during construction.
2. A complete and accepted fiber optic communications system as defined herein.

ITS elements shall include but not be limited to the following:

- Closed Circuit Television Camera (CCTV) Systems
- Ramp Metering Systems
- Data Stations Systems
- Variable Message Signs (VMS)
- Highway Advisory Radio Signs (HARS)
- Highway Advisory Radio Transmitters (HART)
- Communication Conduit System
- Communication Cable and Interface Systems
- Video, Voice & Data Distribution and Transmission Systems
- Communication Hubs
- Permanent Traffic Recorder Station
- Environmental Sensor Stations

The Design-Builder shall provide WSDOT with the x, y, and z GPS coordinates of the newly installed ITS components listed above and the following:

- Loop detectors
- Control cabinets
- All junction and pull boxes and cable vaults
- Mainline fiber-optic cable (every 50 feet)
- Fiber-optic splice vaults
- Stand alone electric service pads

The Design-Builder shall also provide WSDOT with the x, y, and z GPS coordinates of existing components when they are connected to the new components.

The Design-Builder shall design and construct the ITS using the criteria specified within the Contract Documents to:

- Integrate the Project ITS with the existing regional ITS to provide continuous and uninterrupted service of the ITS and associated communications throughout the region.
- Facilitate system integration by using materials and components that are consistent and compatible with those of the existing system.
- Provide a fully functional system of which the design and construction are documented as meeting the requirements of the Contract Documents.
- Provide a final product that facilitates regular maintenance of ITS components.
- Provide a final product that functions as designed in conjunction with all Project components.
- Maintain the operation of all existing ITS components within the Project limits throughout the duration of construction, except as otherwise stated herein.

The Design-Builder shall:

- Install all ITS equipment in the field, including devices on I-5 and on surface streets in the Project area.
- Design and install foundations, poles, supports, and mounting systems necessary to meet the performance criteria for the individual Work element.
- Protect all existing ITS equipment that will not be relocated in this Project.
- Maintain all existing ITS equipment in a fully operable condition, ensuring uninterrupted communication with the TSMC, during the course of the Work.
- Demonstrate to the Department that the designs and installations meet all installation requirements and recommendations, including the supply and connection of all cables between each device and the local controller assembly, and the provision of power to the local controller sufficient to permit the device to function in a local mode.
- Demonstrate that the cabling between the device and the local controller satisfies applicable codes and the performance criteria, and that the device is operable at the local level (i.e., satisfies the test plan for the equipment installed).
- Install all communications material and equipment for all ITS devices.

### **Allowable Working Hours on the Existing ITS System**

The I-5 ITS elements are part of the existing ITS. Various ITS elements (Closed Circuit Television Cameras (CCTV), detector stations (ES), and Variable Message Signs (VMS)) must be installed within the Project limits. These ITS elements shall operate in their current manner throughout construction.

Design-Builder shall not adversely affect any ITS devices outside the Project limits, all of which shall remain operable during construction of the Project.

The Design-Builder shall be restricted to only work on the active part of the ITS from 9:00 a.m. to 3:00 p.m. and 8:00 p.m. to 4:00 a.m. The Design-Builder shall contact the ITS Implementation Engineer 48 hours prior to performing any Work on existing/active ITS devices. The Design-Builder shall perform all Work in a manner ensuring the integrity and proper performance of all ITS components during these hours.

### **Repair Parts**

The Design-Builder shall have repair parts available during construction for all ITS components.

### **Power supply**

The Design-Builder shall install electrical service to provide power to all existing ITS systems and proposed ITS systems pursuant to the Contract Documents. The Design-Builder shall make appropriate arrangements with the electric company for installation or relocation of power service. The Design-Builder shall be responsible for all costs of installing or relocating power sources.

The WSDOT is responsible for all ongoing monthly electricity costs for any new ITS equipment installed in connection with the Project until acceptance of the ITS. WSDOT will be responsible for on-going electricity costs of ITS elements that are not impacted by the Project.

New service cabinets for ITS systems shall be Type E 240/480V single phase services.

For additional requirements see Section 2.16 (Illumination).

### **Core Devices**

The following subsections contain the proposed locations of the core ITS devices that shall be included with the Design-Builder's Proposal.

The Design-Builder shall be responsible for determining the number and location of proposed ITS components required by Section 2.18.2.1 that are in addition to the core ITS devices.

WSDOT will consider proposals that relocate the core ITS devices, provided the same level of functionality is obtained.

### 2.18.1.3 CCTV Systems

The Design-Builder shall conduct all Work necessary to meet the requirements for CCTV Systems in accordance with the Contract Documents.

CCTVs shall be installed at the following locations:

#### Station

LL STA 441+00 (Shoulder on Ex. Sign Bridge)

LL STA 468+50 (Median)

LR STA 257+50 (Shoulder)

LR STA 295+00 (Shoulder)

LL STA 509+00 (Median)

LR STA 331+00 (Median)

LL STA 555+50 (Shoulder)

LR STA 356+00 (In HOV / Northbound gore)

LR STA 374+75 (Median) or LL STA 591+00 (SB Off-Ramp gore) ~ whichever provides the best coverage

LL STA 402+50 (Shoulder) or LL STA 415+00 (Existing Location) ~ whichever provides the best coverage

LR STA 635+00 (SB On-Ramp gore)

LR STA 654+50 (At Hewitt Ave grade)

SR 5 / SR 2 Ramps

LR STA 452+00 (Gore between NB On-Ramps)

LL STA 693+00 (Existing Location)

Two (2) additional cameras will be installed outside of the I-5 corridor. One camera and associated hardware shall be installed on the existing sign bridge on eastbound SR 2, approximately 0.7 miles from the I-5 interchange. Another with associated hardware shall be installed approximately 0.7 miles from the I-5 interchange on SR 526. Final locations will be determined during the ITS design meetings.

### 2.18.1.4 Ramp Metering Systems

Ramp Meters shall be installed at the following locations:

Ramp ID	Description	# Metered Lanes	HOV Bypass	Mainline Loop Location
N/A	SR 527 to NB I-5	1	N/A	LR STA 216+00
N/A	SR 99/SR 526 to NB I-5	2	N/A	LR STA 216+00
FL	Broadway to SB I-5	2	N/A	LL STA 563+00
GR	41st ST to NB I-5	2	N/A	LR STA 380+50
HL	Pacific Ave to SB I-5	2	1	LL STA 632+20
IL	US 2 to SB I-5	1	N/A	LL STA 645+00

JR 1	US 2 to NB I-5	1	N/A	LR STA 456+00
JR 2	Everett Ave to NB I-5	2	N/A	LR STA 456+00
KL	Marine View Dr to SB I-5	1	1	LL STA 695+00

### 2.18.1.5 Data Stations Systems

Data Stations shall be installed at the following locations:

#### Southbound

LL STA 442+00  
LL STA 467+80  
LL STA 493+60  
LL STA 519+00  
LL STA 545+00

LL STA 588+00  
LL STA 613+00

LL STA 666+70

#### Northbound

LR STA 230+60 (install in the same cabinet)  
LR STA 256+50 (may be installed in the same cabinet)  
LR STA 282+30 (may be installed in the same cabinet)  
LR STA 308+00 (may be installed in the same cabinet)  
LR STA 334+00 (may be installed in the same cabinet)  
LR STA 354+00 (may be combined w/SB ramp meter)  
(combine with NB ramp meter)  
LR STA 401+50 (install in the same cabinet)  
LR STA 421+00 (combine w/ SB ramp meter)  
LR STA 433+50 (combine w/ SB ramp meter)  
(combine w/ NB ramp meter)  
LR STA 483+70 (combine w/SB ramp meter)

Two (2) additional data stations will be installed outside of the I-5 corridor. One shall be installed on eastbound SR 2, approximately 0.7 miles from the I-5 interchange. Another shall be installed approximately 0.7 miles from the I-5 interchange on SR 526. Final locations will be determined during the ITS design meetings.

Combining the loops from northbound and southbound I-5 in the same cabinet is encouraged and will be allowed provided that all requirements of the Contract are met and accessibility and safety are not compromised.

### 2.18.1.6 Variable Message Signs (VMS)

VMS shall be installed at the following locations:

#### Station

LR STA 308+60  
MP 195.55 (N of Limits - Sign Bridge) (may combine with HARS)  
LL STA 522+50 (Sign Bridge) (may combine with HARS)

#### View

Northbound  
Southbound  
Southbound

### 2.18.1.7 Highway Advisory Radio Signs (HARS)

HARS shall be installed at the following locations:



The Design-Builder shall be allowed 1 splice in the 48-strand single mode fiber optic cable between the HUB at LR Sta. 190+00 and SR 2. This splice shall occur in a cable vault near the middle of the run.

#### **2.18.1.11 Video, Voice & Data Distribution and Transmission Systems**

The Design-Builder shall install all necessary distribution and transmission equipment to provide an ITS system as described in the Contract Documents. This shall include, but not be limited to a new SONET terminal at the new LR Sta. 190+00 HUB. Video links (multiplexers) for every 10 new cameras built and a video receiver and transmitter for each new camera shall be installed. Fiber optic modems shall also be included for each ES, HARS, and VMS as well as a hub modem for every 10 ES/HARS and one for the VMS's.

#### **2.18.1.12 Communication Hub**

The Design-Builder shall remove and replace the existing HUB at LR 190+00 with the proposed HUB as described in Section 2.18.4.11 and Section 2.18.4.5.11.

#### **2.18.1.13 Permanent Traffic Recorder Station**

Design-Builder shall replace the existing Permanent Traffic Recorder (PTR) Station at approximate station LL STA 623+00 (Pacific Ave. On-Ramp to SB I-5) using the applicable details and requirements contained in the Contract Documents.

#### **2.18.1.14 Environmental Sensor Stations (ESS)**

ESS shall be installed at the following locations:

<b>Station</b>	<b>Description</b>
LL STA 419+00	I-5 / SR 526 Interchange area
LL STA 655+00	I-5 / SR 2 Interchange area

#### **2.18.1.15 Temporary ITS Systems**

The Design-Builder shall schedule installation of a minimum 5 CCTV cameras with PTZ throughout the Project as a priority in the Contract Schedule. The cameras shall be spaced at 1-mile intervals throughout the length of the Project, beginning at LL 441+00. The Design-Builder shall evaluate each location and provide the optimal level of coverage to the public.

They shall be operational and able to be controlled and their video viewed from the TSMC. Video snapshots shall also be available on the internet. The video snapshots shall be updated at least once every minute. The system shall be operational 30 days after the start of construction and continue until the permanent system is accepted.

### 2.18.1.16 Temporary Detections System

The Design-Builder shall furnish and install a temporary detection system capable of providing vehicle speed, volume of traffic and occupancy data - both for northbound and southbound I-5, and for all traffic lanes.

The system shall provide real-time speed, volume, and occupancy data to the TSMC. Outputs shall be compatible with a 170 controller. The system shall provide data within 90% accuracy of 6' diameter induction loops. The temporary system shall operate continuously, day and night until the permanent system is accepted.

The Design-Builder shall schedule installation of the temporary detection system as a priority in the Contract Schedule. The temporary detection stations shall be installed with a maximum spacing of 1-mile throughout the length of the project, beginning at LR 165+00 and LL 375+00.

When no longer needed, the temporary detection system shall be removed in its entirety.

## 2.18.2 Mandatory Standards and Reference Documents

### 2.18.2.1 Mandatory Standards

**General.** Design-Builder shall design and construct the ITS system in accordance with the requirements of the Mandatory Standards listed in Table 2.18.1. The documents in Table 2.18.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.18.1**  
**Mandatory Standards for ITS**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	Proposal for I-5 Design-Build Project	N/A		Proposal
2	WSDOT	Design Manual for Design-Build Project	M22-02		RFP Appendix Z
3	WSDOT	Traffic Manual	N/A		

4	WSDOT	Amendments to the Standard Specifications	N/A		RFP Appendix B4
5	WSDOT	Standard Specifications for Road, Bridge, and Municipal Construction	N/A		RFP Appendix B5
6		Manual on Uniform Traffic Control Devices (MUTCD)-WSDOT Modified	N/A		MUTCD
7		National Electric Code (NEC)	N/A		NEC
8		National Fire Protection Association (NFPA)	N/A		
9		All applicable State and local codes	N/A		
10		Listing Requirements and the Uniform Building Code (UBC)	N/A		UBC
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					

### 2.18.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.18.2 as supplementary guidelines for the design, provision, installation, and construction of the ITS system. These Reference Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.18.2**  
**Reference Documents for Illumination**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
AASHTO	A Policy on Geometric Design of Highways and Streets			
AASHTO	Standard Specifications for Structural Supports for Highway Signs, Luminaries, and Traffic Signals			
AASHTO	Roadside Design Guide			
	EIA/TIA Fiber Optic Test Procedure (FOTP) Standards			FOTP
	Electronics Industries Alliance (EIA) Standards			EIA
	Institute of Transportation Engineers (ITE) Standards			ITE
	National Electrical Manufacturers Association (NEMA) Standards			NEMA
	National ITS Architecture			
	National Transportation Communications			NTCIP

	for ITS Protocol (NTCIP) Standards			
	Rural Utilities Service (RUS) Specifications			
	Telecommunications Industries Association (TIA) Standards			

### 2.18.3 Performance Requirements

#### 2.18.3.1 Meetings

The Design-Builder shall work with WSDOT to form an ITS design team to oversee and provide input on the ITS design and construction. The ITS design team shall develop a schedule for meetings and coordination during the Project from the Notice to Proceed to Project Final Acceptance.

To monitor design progress and assist in the conduct of these meetings, the Design-Builder shall have available for review and inspection the Core ITS Plan showing all proposed locations for highway ITS components and how the equipment locations interrelate to form the highway ITS.

The Design-Builder shall schedule, organize, record minutes, and conduct the ITS design progress meetings to accomplish the following:

- Review existing ITS systems and operations
- Discuss the outcomes of the Design-Builders field verification of all existing ITS systems and components
- Define and finalize ITS functional, technical, operational, and maintenance requirements
- Finalize goals and parameters of ITS design
- Establish integration requirements
- Develop Acceptance of ITS design
- Address and discuss ITS construction issues

### 2.18.4 Design and Construction Criteria

#### 2.18.4.1 General Items

Requirements for the items necessary for design and/or construction of the Intelligent Transportation System that are not explicitly detailed within Section 2.18, are detailed in RFP Appendix B3.18. The Design-Builder shall adhere to all requirements set forth in RFP Appendix B3.18.

In addition to the other requirements for requesting locates, the Design-Builder shall provide the following when requesting WSDOT locates:

- 1) White paint or stakes at dig site.
- 2) Descriptions of area to be located with mile-post and land-marks.
- 3) Limited area per locate (1000ft)

#### **2.18.4.2 ITS Training**

The Design-Builder shall provide WSDOT personnel with instruction in the operation and maintenance of installed ITS elements, including the software.

The Design-Builder shall prepare training documentation. This documentation shall be structured in such a way that it can be used as a reference manual for the training of future staff.

Training courses shall not be scheduled until WSDOT's approval of training documentation.

The ITS training shall include the following:

- VMS Training shall be provided in accordance with RFP Appendix B3.18.4.3.3 "VMS Training"
- ESS Training shall be provided in accordance with RFP Appendix B3.18.12.3.2 "System User Training"

#### **2.18.4.3 WSDOT Personnel**

##### **2.18.4.3.1 ITS Implementation Engineer**

The ITS Implementation Engineer shall act as the WSDOT integrator and liaison between the TSMC, WSDOT Construction administration, and the Design-Builder.

The ITS Implementation Engineer shall perform the following functions:

- Recommend acceptance of components and/or methods to the WSDOT Engineer.
- Review the certification of test device calibration (to American National Standards Institute (ANSI) specified guidelines).
- Make recommendations for acceptance to the WSDOT Engineer.
- Reviews and makes recommendations for acceptance to the Department of the required documentation including specifications, shop drawings, and all measured and recorded values for the system and for each cabinet.
- Witness staking of splice vault, CCTV, cabinet, and communication hub locations.
- Supervise all connections to the existing ITS communication network.
- Review component-submittal packages.
- Make recommendations to the Department for the acceptance of ITS components based on the submittal and other documentation packages.

##### **2.18.4.3.2 WSDOT Electrical Engineer Inspector**

The Department of Labor and Industries has authority over all electrical installations within the State of Washington. The WSDOT has been granted authority over all electrical installations within the rights of way of state highways, provided the Washington State DOT

maintains and enforces an equal, higher or better standard of construction and of materials, devices, appliances and equipment than is required by state law. Design-Builder's QA Manager shall demonstrate compliance to the WSDOT Electrical Engineer Inspector that all electrical installations meet the requirements of the NEC and all applicable state law and provisions.

#### **2.18.4.3.3 Northwest Region Signal Maintenance Superintendent**

The Northwest Region Signal Maintenance Superintendent is Brian Bailey. The Northwest Region Signal Maintenance Superintendent supervises the maintenance of all existing WSDOT signal, illumination and ITS facilities within the rights of way of state highways.

The Northwest Signal Maintenance Superintendent shall perform the following functions:

- Where called for in the Contract provide State supplied ITS materials.
- Where called for in the Contract, collect salvaged ITS materials.
- Performs acceptance inspection of all Design-Builder installed ITS facilities prior to Substantial Completion. (Before these ITS facilities are turned over to the State to maintain).

#### **2.18.4.4 Design Requirements**

##### **2.18.4.4.1 General**

The Design-Builder shall design a complete, operational, and maintainable ITS which includes at a minimum the core devices described in Section 2.18.1. The Design-Builder shall incorporate ITS devices that are compatible with the existing equipment, software, and communication infrastructure of the TSMC.

The Design-Builder shall design and install a system that meets all of the requirements of RFP Appendix B3.18.

The Design-Builder shall design an ITS that is expandable and will support stand-alone operation of all field devices using back-up software components.

The cabinets shall be laid out consistently throughout the Project

The Design-Builder shall provide for the labeling of the ITS devices with WSDOT-provided naming and numbering convention. Cabinet labeling shall be in accordance with RFP Appendix B3.18.1.2.8 "Cabinet Labeling". Junction box, pullbox, and cable vault labeling shall be in accordance with 9-29.2(4) of the WSDOT Standard Specifications.

All material, equipment, and component parts to be furnished shall be new (within 12 months from date of manufacture), of the latest design and manufacture, in an operable condition at the time of delivery and installation, and compatible with the in-place system.

The Design-Builder shall provide a Core ITS Plan that includes the devices described in Section 2.18.1. WSDOT will respond within 10 Business Days of receipt of the plans.

The Core ITS Plan shall have the following items:

- Title sheet, north arrow and scale bar.
- Legend of symbols.
- Existing ITS features.
- Locations of all proposed ITS devices with labels
- Proposed channelization.
- Power service locations.
- Conduit runs and junction box location.
- 1 Line diagram of the ITS System

The Design-Builder shall provide a final ITS plan that addresses the comments received from the Core ITS Plan review and any issues raised during the ITS design meetings. WSDOT will respond within 10 Business Days of receipt of the final ITS plans.

The final ITS plans shall be complete and include all items from the Core ITS Plan as well as the following:

- Wire and Construction Notes
- ITS Details
- All ITS labels
- Calculations to support transformer sizing, and transformer overcurrent protection devices
- Conduit fill and junction box capacity calculations
- Service load calculations
- Permission from bridge for attachment to structures or installations, where such attachment may affect structures
- Soils information for foundation design

### **Power Service**

The Design-Builder shall be responsible for obtaining (from the power service providers and WSDOT) review and approval of its power service design. The Design-Builder shall coordinate and meet all requirements as specified by the power service provider and Section 2.16 for the complete and operational power service to all required locations.

#### **Service Drops for Electric Equipment Cabinets**

If type B or D (120/240 VAC) services are used, the service drop should be within 500 feet of the cabinet containing the electronic equipment.

Distances greater than 500 feet shall have a type E 480 VAC service installed. The 480 VAC should then be run to the electronic equipment cabinet and transformed to 120 VAC.

The transformers shall not be mounted on or in the electronic cabinet.

**Location of ITS Devices**

All ITS devices shall be installed within WSDOT Right-of-Way. All ITS devices shall be located outside of the clear zone (per the *Roadside Design Guide*) and in an area where access to equipment shall not affect traffic operations nor require maintenance of traffic. With WSDOT approval, the Design-Builder may install barrier, guardrail, or crash protection equipment to protect new and existing ITS devices that are in the clear zone.

The Design-Builder shall not locate any cabinet in the highway median.

**Maintenance Pullouts**

Paved maintenance pullouts shall be provided at all cabinet locations and other locations where maintenance vehicles will be required (i.e., bucket truck access near VMS structure, CCTV poles, and HART Antennae).

**Existing Facilities**

The Design-Builder shall be responsible for locating all underground existing facilities (City, County, State, and Utilities) and designing all ITS elements to avoid conflicts with these facilities. In the cases of unavoidable utility conflicts, the requirements of Section 2.10 shall be followed.

The Design-Builder shall be responsible for all repairs to facilities damaged by the Design-Builder.

**2.18.4.4.2 CCTV Systems****General**

The Design-Builder shall provide for the video feeds from cameras to be sent to a communication hub in the field on distribution fiber and then be transmitted to the TSMC on the communication fiber.

The Design-Builder shall provide the CCTV hardware. The CCTV hardware components shall include the CCTV Camera, CCTV pole, pole foundation, CCTV control cabinet (ground-mounted), and the video/communication components and cables.

**Camera Location**

Camera locations shall be as described in Section 2.18.1.3

**Location Criteria**

Video surveillance locations for CCTV surveillance assemblies shall provide full, unobstructed viewing of all freeway segments in the Project.

Plans shall include the complete Site design, structural design of camera pole and foundation, exact camera placement (plan and elevation), and cabinet layout.

To avoid washout of the video image that occurs when the camera points bright light from a low light condition, cameras shall be located so that the main view will have the camera pointed away from bright light.

CCTV cameras shall be able to turn 360 degrees.

CCTV cameras shall have overlapping coverage.

CCTV is located along the highway at a maximum distance of 1 mile between cameras.

A camera is typically located at each interchange. This allows monitoring of ramp metering as well as ramp queues. A minimum of two cameras should be placed at freeway-to-freeway interchanges (one to monitor each freeway).

Cameras should, where feasible, be located so that the message of an adjacent Variable Message Sign (VMS) can be read. This allows for visual verification of VMS status.

Camera placement shall allow for monitoring of ramp metering and ramp queues, if applicable

The best camera location will often be on or next to an under crossing because of the increased altitude over the roadway or view of an interchange. If possible, the camera should be located off of the bridge structure. Vibration of the bridge can have an effect on camera reliability (usually this affect is minimal). Often however, because of obstructions such as trees, the bridge structure will clearly be the best place to install the camera. WSDOT must design a suitable foundation for this camera pole. Ideally this pole would be located above a bridge column or bent to reduce vibration. WSDOT should be notified promptly if Design-Builder proposes to locate a camera on a bridge.

A less desirable alternative to bridge placement is to place the camera adjacent to the roadway, a maximum of 10 feet from the bridge structure, and extending a minimum 30 feet above the top of the under crossing. The camera may then be serviced from the roadway on top of the under crossing.

Poles and cameras shall not be placed in the median of the highway (unless specifically called for in Section 2.18.1.3)

### **Camera Height**

It is often desirable to locate cameras as high as possible over the roadway, to a maximum of 60 feet. The camera pole shall be 50 feet tall. However, cameras mounted on retaining walls and under structures may not need a pole. In rare instances a 60-foot pole may be used, but only when service access is located directly underneath, since the largest Northwest Region bucket truck reaches 65 feet. WSDOT will consider proposals with pole elevations of less than 60 feet, provided the level of coverage has been approved by WSDOT.

If proposals are submitted with different camera locations or heights than detailed in Section 2.18.1.3 WSDOT must approve the coverage before the Design-Builder finalizes the applicable installation. WSDOT will schedule the use of a bucket truck from NW Region Signals Branch.

### **CCTV System Components**

Most CCTV components will be obtained under proprietary requirements. The Design-Builder shall use the items required by RFP Appendix B3.18.2.2 “Materials”. Major CCTV components are as follows:

#### **Camera Assembly**

The camera assembly shall be in accordance with RFP Appendix B3.18.2.2.1 “Camera Assembly”.

#### **Camera Pole**

The camera pole shall be in accordance with RFP Appendix B3.18.2.2.2 “Camera Poles”.

#### **Camera Control Cabinet (Pad Mount)**

The camera cabinet houses the video/data transceiver and the power distribution panel. The camera cabinet requires 120 volts AC for power. The camera should be clearly visible from the camera cabinet location.

The Design-Builder shall provide 1-2” space conduit from every cabinet to the adjacent junction/pull boxes.

The camera control cabinet shall be in accordance with RFP Appendix B3.18.2.2.3 “Camera Control Cabinet (Pad Mount)”.

#### **CCTV System Cabling**

The CCTV System Cabling shall be in accordance with RFP Appendix B3.18.2.2.4 “CCTV System Cabling” ICCTVCABLE.DT1

#### **Communications**

Camera control signals shall be carried from the TSMC over single mode fiber optic cable to the communications hub nearest the camera. The signal continues shall on single mode fiber optic cable to the video/data transceiver in the camera cabinet, and a control cable shall connect the video/data transceiver to the camera.

The video signal shall leave the camera via camera control cable to the camera cabinet. The video/data transceiver in the camera cabinet place the signal onto single mode fiber optic cable back to the nearest communication HUB.

### **2.18.4.4.3Ramp Meter Installations**

Although there is a significant difference in function between a data station (surveillance) and a ramp meter station (surveillance and control), equipment specifications for both are nearly identical.

### **Background**

WSDOT ramp meters perform all data station functions and shall, control the flow of vehicles entering the freeway by allowing vehicles to enter, one at a time, at a rate that can be accommodated by the mainline facility. This is accomplished with a standard traffic signal display that is actuated by the ramp meter controller.

Motorists are given advance warning of the ramp meter operation prior to entering the metered ramp by means of warning signs and yellow flashing beacons located at the head of the ramp or on the adjacent local arterial.

There are two ways a metering rate is determined: remote or through standby metering

### **Remote metering**

In the remote metering mode of operation, the central computer determines metering rates for all ramp meter locations. This is the normal mode of operation for the Seattle system. Central is capable of adjusting the upstream metering rates based on the downstream conditions. The length of each on-ramp queue is also taken into account. Metering start and end times can be adjusted from Central

### **Standby metering (local control)**

Standby metering is used when communications between the ramp meter and the central computer are interrupted. In these cases, each ramp meter will determine a metering rate for its on-ramp according to local traffic conditions or by a time of day table, while also taking into account the on-ramp queue conditions. In standby metering, a ramp meter operates independently, without coordinating with other ramp meters.

### **Controller**

Design-Builder shall use Model 170 controllers for data stations and ramp meters. The controller shall process traffic volume and occupancy information and sends this information to the central computer at TSMC. At ramp meter locations, the controller shall also operate the signal displays and warning sign flashing beacons.

All controllers shall have a modem for communication of information to and from a compatible modem in a communication hub.

### **General**

Wherever possible, metered ramps should be provided with HOV bypass lanes. These allow transit, carpools, vanpools and motorcycles to bypass queues at the ramp meter signal. (Design Manual For Design-Build Projects Section 1050 RFP Appendix Z).

When no shoulder or HOV lane is available, preemption for emergency vehicles should be considered.

**Location Criteria**

Ramp metering locations shall be as described in Section 2.18.1.4

Cabinets must be easily accessible from the ramp and/or the mainline by maintenance and operations personnel. Cabinets should be placed so that the signal display, ramp and mainline loops are visible from the front door. The cabinet location shall be protected from traffic by placing them out of danger (behind a guardrail for example). The cabinets should also be placed out of the flood plain and above the water level.

The Design-Builder shall consult with WSDOT for final loop, stop bar, signal, and advance warning sign placement.

At the mainline loop locations, junction boxes shall be placed on both sides of the freeway (connected by conduit) to handle the mainline loops of that location, so as to avoid closing. The entire roadway when performing loop repair.

**Hardware**

All cabinet equipment for new data stations and ramp meter controller stations are to be identical.

The major components of a data station/ramp meter are:

**Cabinet Equipment:**

1. Controller
2. Modem
3. Display Panel
4. Detector Amplifiers
5. Output/Power Distribution Assembly
6. Load Switches
7. Current Monitor (suggested)
8. Flasher for Warning Sign Beacon

**Field Equipment:**

9. Junction Boxes
10. Detectors
11. Signal Display
12. Warning Signs and Flashing Beacons
13. Central Computer (remote ramp metering only)

A general description of each item follows. For further information see RFP Appendix B3.18.3.

**Cabinets**

The Design-Builder shall provide 1-2" spare conduit from every cabinet to the adjacent junction/pull boxes.

The ramp meter cabinets shall be in accordance with RFP Appendix B3.18.3.1.3 "Model 334 Cabinet".

For master detail see RFP Appendix C3.18

Ramp meter cabinets are physically limited to 40 loops. The number of loops for a single cabinet shall not exceed 32 loops.

### **Controllers**

The ramp meter controllers shall be in accordance with RFP Appendix B3.18.3.1.1 "Model 170E Controller".

For master detail see RFP Appendix C3.18

### **Modems**

The modems shall be in accordance with RFP Appendix B3.18.3.1.1 "Model 170E Controller".

Ramp meters and data stations require drop-insert modems capable of re-transmitting a signal to the next modem and be capable of operating in a ring configuration.

### **Detector Display Panel**

For master detail see RFP Appendix C3.18

### **Auxiliary Display Panel**

For master detail see RFP Appendix C3.18

### **Loop Detector Amplifiers**

Loop amplifiers shall be in accordance with RFP Appendix B3.18.3.1.4 "Rack Mount Vehicle Loop Detectors".

### **Output/Power Distribution Assembly (Power Panel)**

For master detail see RFP Appendix C3.18

### **Load Switches**

For master detail see RFP Appendix C3.18

### **Junction Boxes**

Junction boxes are located alongside the roadway adjacent to roadway loops. The loops are spliced in the junction box to shielded lead-in cable that then runs to the loop amplifiers in the cabinet. Junction boxes can also be used as "pull points".

Junction boxes should never be placed in the traveled roadway. When a junction box is placed in the shoulder in front of the barrier section where occasional traffic exposure occurs, a traffic bearing junction box shall be used.

For master detail see RFP Appendix C3.18

### **Detectors Loops**

The detector loops shall be in accordance with RFP Appendix B3.18.3.2.2 “Induction Loop Vehicle Detectors”.

The Design-Builder shall furnish and install queue detection on metered entrance ramps and collector-distributor roads. The Design-Builder shall furnish and install queue loops (up to 4 per metered lane) at the distances based on volume and storage capability of the ramp. The location of queue loops shall be determined during the ITS design meetings.

The Design-Builder shall locate detector loops in the center of the lane and a minimum of 1 foot from transverse panel joints. The Design-Builder shall not exceed a 1,000-foot length for loop detector lead-in cable.

Mainline loops (two per lane) shall also be installed at all metered ramps as detailed in Section 2.18.1.4.

The Design-Builder shall provide the WSDOT Implementation Engineer with the calculations showing that the inductance in the cable from the amplifiers to the loop is less than the inductance of the loop itself.

All vehicle detection loops shall be identified using WSDOT naming convention. The Design-Builder shall consult with WSDOT for the proper names.

### **Meter Signal Display**

Signal displays shall be in accordance with RFP Appendix B3.17.

### **Warning Sign and Flashing Beacon**

#### **POLICY STATEMENT ON ADVANCED WARNING FOR RAMP METERING**

Ramp meter warning signs and flashing beacons shall be used to:

- 1) Provide motorists with advanced warning that a ramp is being metered.
- 2) Provide motorists with the option of using a ramp that is being metered.
- 3) Advise motorists of impending stops, due to ramp metering, on a ramp where sight distance concerns exist.

To provide advanced warning and the option of using a metered ramp, all ramp metered ahead signs shall be clearly visible from all approaches to the ramp. The advanced warning signs will be placed at the head of the ramp. If a decision point exists at a location other than the ramp entrance, the sign shall be placed so that it is clearly visible from that location.

To advise motorists of stops ahead on a limited sight distance ramp, a second advanced warning sign may be placed on the ramp. This sign should be approximately half the distance from the head of the ramp to the stop bar.

When metering is in effect, the beacons shall flash. All other times, the beacons are off. A warning sign is supplied only for a ramp meter, not for a data station. An aluminum NEMA 3R box, housing the flasher for the beacon, shall be installed on the sign pole over the handhold, approximately four feet above ground level, under the warning sign.

### **Central Computer**

The central computer, a Digital VAX system located at TSMC, shall receive and processes data from all data station/ramp meters simultaneously. Central shall also transmit ramp meter instructions to ramp meters. Ramp metering shall be controlled from central during remote metering operation.

## **2.18.4.4 Data Station Installations**

Although there is a significant difference in function between a data station (surveillance) and a ramp meter station (surveillance and control), equipment specifications for both are nearly identical.

### **Background**

Data stations shall collect current volume, occupancy, and speed data (when speed loops are present) from specific roadway sections. This information shall be transmitted to the central computer (Central) located at TSMC for analysis and application.

### **Location Criteria**

Data Station locations shall be as listed in Section 2.18.1.5.

The data station controller cabinet shall be situated along the freeway mainline adjacent to corresponding roadway detection loops.

Cabinets must be easily accessible from the ramp and/or the mainline by maintenance and operations personnel. The cabinet locations shall be protected from traffic by placing them behind a guardrail or other similarly protected area. The cabinets shall be placed out of the flood plain and above the water level.

At the mainline loop locations, junction boxes shall be placed on both sides of the freeway (connected by conduit) to handle the mainline loops of that location. This way the entire roadway will not have to be closed for loop repair.

### **Hardware**

The major components of a data station/ramp meter are:

### **Cabinet Equipment:**

1. Controller
2. Modem
3. Display Panel
4. Detector Amplifiers
5. Output/Power Distribution Assembly

**Field Equipment:**

6. Junction Boxes
7. Detectors

From a construction standpoint, the only differences between a data station and a ramp meter are the signal display, warning signs, and the number of loops needed on the on-ramp of a ramp meter. A general description of each item follows. For further information see RFP Appendix B3.18.3.

**Cabinets**

The Design-Builder shall provide 1-2" spare conduit from every cabinet to the adjacent junction/pull boxes.

The data station cabinets shall be in accordance with RFP Appendix B3.18.3.1.3 "Model 334 Cabinet".

Data station cabinets shall be physically limited to 40 loops. The number of loops for a single cabinet shall not exceed 32 loops.

**Controllers**

The data station controllers shall be in accordance with RFP Appendix B3.18.3.1.1 "Model 170E Controller".

**Modems**

The modems shall be in accordance with RFP Appendix B3.18.3.1.1 "Model 170E Controller".

**Detector Display Panel**

For master detail see RFP Appendix C3.18

**Loop Detector Amplifiers**

Loop amplifiers shall be in accordance with RFP Appendix B3.18.3.1.4 "Rack Mount Vehicle Loop Detectors".

**Output/Power Distribution Assembly (Power Panel)**

For master detail see RFP Appendix C3.18

The transformers shall not be mounted on or in the electronic cabinet.

**Junction Boxes**

Junction boxes shall be located alongside the roadway adjacent to roadway loops. The loops shall be spliced in the junction box to shielded lead-in cable that then runs to the loop amplifiers in the cabinet. Junction boxes may be used as "pull points".

Junction boxes should not be placed in the traveled roadway. When a junction box is placed in the shoulder in front of the barrier section where occasional traffic exposure occurs, a Traffic Bearing junction box shall be used.

For master detail see RFP Appendix C3.18.

**Detectors Loops**

The detector loops shall be in accordance with RFP Appendix B3.18.3.2.2 "Induction Loop Vehicle Detectors".

The Design-Builder shall locate detector loops in the center of the lane and a minimum of 1 foot from transverse panel joints. The Design-Builder shall not exceed a 1,000-foot length for loop detector lead-in cable.

The Design-Builder shall provide the WSDOT Implementation Engineer with the calculations showing that the inductance in the cable from the amplifiers to the loop is less than the inductance of the loop itself.

New and retrofitted data stations shall have mainline speed loops, located 17 feet downstream of the mainline loops, used for calculating vehicle speed and length. See RFP Appendix C3.18.

Mainline loops (two per lane) shall be installed at all metered ramps listed in Section 2.18.1.4.

**Vehicle Detection**

The Design-Builder shall install permanent induction loops in on-ramps, exit-ramps, and auxiliary and mainline lanes.

The Design-Builder shall not have more than 32 detector inputs per cabinet.

**2.18.4.4.5 Variable Message Signs (VMS)**

The Design-Builder shall install LED Walk-in NTCIP 105x27 Full Matrix VMS from Daktronics, Inc at every VMS location.

**General**

The Design-Builder shall have a Structural Engineer licensed in the State of Washington design the VMS support structure. The Design-Builder shall mount the VMS to the support structure.

The Design-Builder shall install maintenance walkways for all VMS Signs as detailed in Standard Plan G-6.

The Design-Builder shall account for sign viewing angle for each VMS location. The Design-Builder shall provide VMSs with a safe ingress/egress structure to accommodate maintenance personnel.

The Design-Builder shall obtain WSDOT approval of the sign locations with safety and aesthetics considered as part of the design approval process. An operating policy will be established by WSDOT working with the Design-Builder and the ITS design team that addresses sign messages, control, and responsibilities. Messages on the signs will be controlled from the TSMC.

The Design-Builder shall locate the VMSs so no lane closures are required to perform maintenance.

**Location**

Variable Message Sign locations shall be as described in Section 2.18.1.6.

**Control Cabinet**

The VMS cabinet houses the controller, modem, and associated electrical and climate control equipment. The VMS requires 120 volts AC (VAC) for power, which may be stepped down from 480 VAC if needed. The cabinet should be large enough to provide adequate air circulation for cooling. The cabinet is usually mounted to the outside of the VMS support (i.e. sign bridge)

The Design-Builder shall provide 1-2" spare conduit from every cabinet to the adjacent junction/pull boxes.

Control cabinets shall be designed and constructed in accordance with RFP Appendix B3.18.4.2.5 "Ground-mounted VMS Field Cabinet" and RFP Appendix B3.18.4.2.5 "Control System".

**Modem**

The Design-Builder shall specify an appropriate modem and communication circuit for VMS located beyond the limits of the fiber optic cable facility.

**Controller**

The controller shall locally controls the message display functions of the sign.

The controller shall be designed and constructed in accordance with RFP Appendix B3.18.4.2.9 "VMS Sign Controller".

**Sign Housing**

The sign housing shall be designed and constructed in accordance with RFP Appendix B3.18.4.2.3 "Sign Housing".

**Communications**

VMS control signals shall be carried from the TSMC to the communications hub over single mode fiber optic cable. The signal shall then put on a distribution, single mode fiber optic cable that shall carry it to the VMS cabinet.

VMS Software shall be in accordance with RFP Appendix B3.18.4.2.10 “Control Software”.

#### **2.18.4.4.6 Highway Advisory Radio Signs (HARS)**

##### **Background**

Highway Advisory Radio (HAR) is used as a driver information system to warn motorists via their car radio of construction and maintenance roadway closures, and major traffic incidents. HAR has an advantage over Variable Message Sign (VMS) in that more detailed information can be relayed to the motoring public, giving them the chance to use alternate routes. Both the Radio Shop and the TSMC should be included in any plan review involving HAR.

##### **Restrictions on Message Content**

HAR message content is restricted by federal regulations. WSDOT restricts HAR messages to non-commercial voice information pertaining to traffic and road conditions, major incidents, traffic hazards and travel advisories.

##### **HAR Signs**

HAR signs tell the motorists to tune to the HAR broadcast when beacons above the sign are flashing. HAR signs are typically located on the approach legs of major freeway interchanges, thus giving the motorist ample warning to avoid an incident or closure. Signs should be located far enough from the alternate route to give motorist time to locate radio channel (15-20 seconds), listen to message twice (approx. 60 seconds), and divert to alternate route.

##### **General**

The current standard is "**TRAFFIC ADVISORY / TUNE 530 AM / WHEN FLASHING**" on a 7' by 15', black on yellow sign.

##### **Location**

HAR Sign locations shall be as listed in Section 2.18.1.7.

##### **Location Criteria**

The distance from sign to alternate route on a 55 mph freeway should be approximately 1 1/2 to 2 miles. The distance from the HAR transmitter to its HAR sign should not exceed 2 miles. Existing sign spacing standards should be used when placing HAR sign, except that the motorist should not have to take their attention from a difficult stretch of roadway (sharp curves, merges, etc.) to tune radio. HAR signs should be located within sight of a CCTV to visually confirm the status of flashing beacons.

##### **HARS Components**

For further information see RFP Appendix B3.18.5 “Highway Advisory Radio Sign (HARS)”.

All components for the HARS shall be in accordance with RFP Appendix B3.18.5.2 “Materials”.

**Relay Panel and Power Supply**

The relay panel and power supply shall be located in the control cabinet. The HAR sign shall use a 12-volt DC power supply and relay to interface with the 170E controller.

**Manual Switch**

The manual switch allows for control of the HAR sign beacons and illumination for maintenance and testing. The manual switch has three positions: "manual on" for control of beacons at the HAR sign, "off" to turn the signs beacons and equipment off, and "auto on" to remotely control the sign.

**2.18.4.4.7 Highway Advisory Radio Transmitters (HART)****Background**

Highway Advisory Radio (HAR) is used as a driver information system to warn motorists via their car radio of construction and maintenance roadway closures, and major traffic incidents.

**General**

The HAR transmitter shall be controlled remotely from the TSMC via singlemode fiber optic. The maximum transmitter output is 10 watts.

**Location**

HAR Transmitter locations shall be as described in Section 2.18.1.8.

**Location Criteria**

The HAR transmitter is shall be located at the interchange that the HAR signs are covering. The transmitter shall be located within the open area within a loop ramp, since the transmitter's antenna requires a 20-foot minimum radius on the ground. The HAR transmitter shall be located on the highest ground possible, to aid reception of the transmission.

**HART Components**

The Design-Builder shall provide 1-2" spare conduit from every cabinet to the adjacent junction/pull boxes.

The HART system consists of an antenna, control cabinet, AM transmitter, voice storage unit, and a relay panel and power supply. For further information see RFP Appendix B3.18.6 "Highway Advisory Radio Transmitter (HART)".

All components for the HART shall be in accordance with RFP Appendix B3.18.6.2 "Materials".

**2.18.4.4.8 Communication Conduit System****General**

The TSMC shall employ various methods of communication from its central VAX computer to ITS components in the field. Voice, data and video communications are used by TSMC.

TSMC shall be capable of communicating to ITS devices through fiber optic cable, copper twisted pair cable, leased telephone lines and microwave transmission. These communication lines shall be housed and protected by conduit and related structures.

### **Location**

The Communication Conduit System shall consist of two 4-inch conduits with innerduct (including cable vaults, pull boxes, junction boxes, etc) extending from the south (existing communication hub near LR STA 190+00) to the north (south bridge seat of the Snohomish River bridge). There will also be two 4-inch conduits with innerduct (and associated vaults and boxes) installed for approximately 0.7-mile west on SR 526 from the I-5 interchange and 0.7-mile east on SR 2 from its interchange with I-5. Whenever possible, conduits shall be installed within new structures.

### **Communication Conduit System Components**

The Communication Conduit System Components shall be in accordance with RFP Appendix B3.18.7.1 "Description" and RFP Appendix B3.18.7.2 "Materials".

### **Conduit**

Conduit may be buried in a trench, attached to or incorporated into structures.

When buried, all PVC conduit shall be encased in controlled density-fill in accordance with RFP Appendix B3.18.7.2.3 "Controlled-density Fill" and buried in a trench with fiber optic warning tape and a location wire in accordance with RFP Appendix B3.18.7.2.1 "Location Wire and Warning Tape".

When attached to structures, Rigid Galvanized Steel, RGS, must be used along with approved mounting brackets. Design-Builder shall contact WSDOT prior to attaching conduit to a bridge.

Innerduct shall be in accordance with RFP Appendix B3.18.7.2 "Materials".

### **Cable Vaults**

Cable vaults shall be used as pull points, splice locations, and where the mainline conduit has major changes in direction. They shall be also used whenever mainline communications conduit changes from PVC to GRS and visa versa.

Cable Vaults shall be in accordance with RFP Appendix B3.18.7.2.2 "Cable Vaults and Pull Boxes".

The Design-Builder shall coil and rack at least 50 feet of cable at all cable vaults.

### **Junction Boxes**

Junction boxes can be used as "pull points" for copper twisted pair. Type 2 should be used as a minimum for distribution communication cables.

Junction boxes shall never be placed in the traveled roadway. When a junction box is placed in a paved shoulder, a traffic bearing junction box shall be used.

For master detail see RFP Appendix C3.18

Generally, in grade junction boxes are sized following standard Plan J-11a.

All sizing of junction boxes, whether in-grade or structure mounted, shall meet the requirements of the National Electrical Code, Section 270-18.

Maximum spacing of junction boxes shall be no more than 300-feet.

### **Pull Boxes**

Pull boxes shall be spaced at 1000-foot intervals along mainline conduit runs. Pull boxes, as their name implies, are used as intermediate pull points where cable vaults are not needed. Pull boxes are generally smaller than cable vaults. Splices are not allowed in pull boxes.

Pull Boxes shall be in accordance with RFP Appendix B3.18.7.2.2 “Cable Vaults and Pull Boxes”.

A pull box shall be placed at all cabinet locations.

### **Terminal Cabinets**

A fiber optic terminal cabinet shall be installed at the I-5 and SR 2 interchange. The mainline and distribution cables shall terminate in patch panels within this cabinet.

The Design-Builder shall provide 2-2” spare conduit from every cabinet to the adjacent junction/pull boxes.

Fiber Optic Terminal Cabinets shall be in accordance with RFP Appendix B3.18.8.2.8 “Fiber Optic Terminal Cabinets”.

### **Existing Conduit Systems**

Existing conduit systems shall consist of stick PVC, or GRS conduit.

When installing fiber-optic cables in existing conduits through existing pull boxes and cable vaults, the Design-Builder shall check the cable route to ensure that there is a smooth transition between exit and entrance elevations and that the horizontal angle is not so sharp as to cause damage to the cable as it is being pulled through the existing conduit. If the Design-Builder encounters sharp bends, the Design-Builder shall reinstall conduit to provide a smooth transition.

The Design-Builder shall clean the existing conduit of any debris that could impede pulling fiber-optic or copper cable through it or that could damage the cable if the debris remained.

### **Directionally Bored NMC**

When installing conduit under slope paving, the Design-Builder shall use directional boring so as to not damage the slope paving.

The bore under the roadway surface shall extend 10 feet beyond the pavement edge or curb line.

#### **2.18.4.4.9 Communication Cable and Interface Systems**

The Design-Builder shall provide a communication network to serve the highway ITS components within the ITS Project limits. The system shall also provide the required communication links to the highway ITS components that are not located within the Right of Way for the Project.

The Design-Builder shall not substitute or apply any part or attach any piece of equipment contrary to the manufacturer's recommendations and standard practices.

All locations containing identical equipment shall be configured and wired in a consistent if not identical manner by the Design-Builder, including internal wiring and harnesses, wiring color codes, labeling terminal block positions, termination strips, power service configuration, and panel and equipment mounting and locations. Wiring details shall be similar to those shown in RFP Appendix C3.18 but wiring diagrams will be finalized during the design meetings.

Communication Cable and Interface System shall be in accordance with the following:

RFP Appendix B3.18.8.1 "Description"

RFP Appendix B3.18.1.2 "Materials"

#### **Fiber-Optic Cable**

The Design-Builder shall locate mainline fiber-optic cable or cable conduit systems as close to the Right-of-Way line as practicable. The Design-Builder shall minimize the number of transverse crossings of the freeway. The Design-Builder shall place the fiber-optic trunk cable in conduit.

Fiber-Optic Cable shall be in accordance with RFP Appendix B3.18.8.2.1 "Cables".

#### **Fiber-Optic Connection Components**

Fiber-optic connection components will be necessary to connect Project-installed cable to the ITS communications network.

#### **Patch Cords**

For indoor patch cords, the Design-Builder shall meet the following requirements for single-mode fibers:

- Indoor patch cords shall not be armored.

- Single mode patch cord jackets shall be yellow, 3 mm (0.12 inches) outside diameter, have aramid strength members, and yellow boots.
- Patch cord fibers shall have a secondary buffer from 250  $\mu$ m to 900  $\mu$ m.
- Patch cords shall be individually constructed.
- Patch cords shall not have factory fusion fiber splices.
- Patch cords shall have FC-UPC connectors.
- Boots shall be glued to the patch cord jacket.

### **Fiber Connectors**

Fiber optic connectors shall be in accordance with RFP Appendix B3.18.8.2.3 “Fiber Optic Connector”.

### **Patch Panel Components**

Patch panels shall be in accordance with the following:

RFP Appendix B3.18.8.2.2.1 “Fiber Optic Patch Panels”

RFP Appendix B3.18.2.2.1.1 “Wall Mounted Fiber Optic Patch Panel”

RFP Appendix B3.18.2.2.1.2 “Small Cabinet Fiber Optic Patch Panel”

RFP Appendix B3.18.2.2.1.3 “Cabinet Fiber Optic Patch Panel”

RFP Appendix B3.18.8.2.2.1.4 “HUB Fiber Optic Patch Panel”

### **Fiber Splice Closure**

The Design-Builder shall provide an outdoor fiber splice closure that includes an outer shell and plastic splice trays.

The temperature rating for the splice closure shall be -30 to 60°C (-22 to 140°F).

In addition to the following requirements, the fiber splice closure shall be in accordance with RFP Appendix B3.18.8.2.5 and RFP Appendix B3.18.8.3.3 “Fiber Optic Splice Closure”.

The splice enclosure (which allows re-entry of fiber-optic cable) shall permit the cable to enter without exceeding the minimum bending radius, have non-oxidizing coating on all connections. The enclosure shall have space to terminate up to two trunk cables and pigtails. All cables shall enter the enclosure through one end of the enclosure

### **Outer Shell**

The outer shell shall meet the following requirements:

- Protect splices from damage
- Be of salt corrosion resistant material and compatible materials not supporting galvanic cell action
- Be re-enterable
- Permit splicing without circuit disruption
- Have cable strain relief and be compatible with the splice trays and cables

### **Splice Tray**

The splice shall meet the following requirements:

- Allow entry to individual fibers
- Be stackable
- Hold 12 splices and 24 fibers
- Not violate bare fiber bend radius
- Have room for splice identification on the cover

### **Wireless Communications**

The Design-Builder may temporarily use wireless communications between field devices and communication nodes. Permanent communication shall use fiber optic cable.

#### **2.18.4.4.10 Video, Voice & Data Distribution and Transmission Systems**

The Design-Builder shall disconnect and remove from the existing Hub and then reinstall and reconnect in the new Hub, all of the equipment listed below:

- 2 - Black Box EIA-232 Broadcast Units
- 2 - Optelecom 5000 series chassis with power supplies
- 12 - Optelecom 5710 video receiver cards (inside chassis)
- 2 - Optelecom T1 transceiver (inside chassis)
- 1 - Model 400 modem rack with modems
- 1 - Telco channel bank with data cards
- 1 - Telco ring generator
- 1 - EIA-232/422 converter, chassis, and power supply
- 1 - Decimux video transmitter
- 1 - Vicon EIA-422 Broadcast Unit
- 1 - RuggedCom switch
- 1 - Radiant switch
- 60 - SMFO [I-5 mainline to south]
- 12 - SMFO [link to WSP & weigh station]
- 24 - SMFO [link to WSDOT El Capitan offices]
- 24 - SMFO [SR 527 mainline]
- 36 - SMFO [SR 526 mainline]
- 2 - 6 TWP [ES-221 and CC-221]
- 1 - COAX [CC-221]

The Design-Builder shall provide, install, and connect three (3) new - 72port preterminated patch panels. The 60 SMFO and the 12 SMFO shall be spliced to one, the 2-24SMFO cables to another, and the 36 SMFO should be spliced to the last.

The Design-Builder shall provide, install, and connect a new Vicon EIA-422 Broadcast Unit once the new ITS devices are activated.

The existing patch panels and TV shall remain State property.

The new ITS shall be connected to the existing single mode fiber optic system with all new equipment.

All devices of Video, Voice & Data Distribution and Transmission Systems shall be in accordance with RFP Appendix B3.18.9 “Video, Voice, Data Distribution and Transmission Systems”.

#### **2.18.4.4.11 Communication Hub**

##### **Hubs**

Communication hubs shall be designed for use as information gathering points in the field. Data from the field devices shall be transmitted to a local hub via twisted pair copper and single mode fiber optic cables. This data shall be placed on a single mode optical fiber and sent to TSMC where it may be compiled for immediate use and stored for future use.

The Design-Builder shall design and install all necessary new equipment and the equipment listed in section 2.18.4.4.10 in the new Communication Hub.

The Communication Hub shall be in accordance with RFP Appendix B3.18.10 “Communication Hub / Concrete Universal Enclosure (CUE)”.

#### **2.18.4.4.12 Permanent Traffic Recorder Station**

##### **Location**

There is an existing Permanent Traffic Recorder (PTR) Station at approximate station LL STA 623+00 (Pacific Ave. On-Ramp to SB I 5.)

The new PTR location shall be between LL STA 605+00 and 618+00.

The PTR Station shall be in accordance with RFP Appendix B3.18.11.

The design and installation of the PTR shall be as shown in RFP Appendix C3.18.

#### **2.18.4.4.13 Environmental Sensor Stations**

The Environmental Sensor Station shall be in accordance with RFP Appendix B3.18.12 “Environmental Sensor Stations (ESS)”.

#### **2.18.4.4.14 Temporary ITS Systems**

The Design-Builder shall design and install the CCTV cameras as described in Section 2.18.1.15. The Design-Builder shall select, provide, and install the camera systems and communications to transport full motion video (30 fps) to the Dayton TSMC and snapshot JPEG to the internet.

Individual NTSC composite signals and PTZ control for each camera will be available at the Dayton TSMC. For the purpose of meeting this requirement, the Design-Builder may utilize up to 10 video and PTZ channels between the HUB at LR 190+00 and the TSMC, which will be provided by the State, with a minimum of 30 days advanced notice.

Camera height shall be in accordance with Section 2.18.4.4.2 CCTV Systems, subsection Camera Height.

Camera locations shall be in accordance with Section 2.18.4.4.2 CCTV Systems, subsection Location Criteria with the exception of overlapping coverage.

The Design-Builder shall be responsible for all costs, including utility charges, associated with the Temporary ITS System.

The Design-Builder shall be responsible for the removal of the Temporary ITS System after the final ITS system is accepted.

#### **2.18.4.4.15 Temporary Detections Systems**

The Design-Builder shall furnish and install a temporary detection system capable of providing vehicle speed, volume of traffic and occupancy data - both for northbound and southbound I-5, and for all traffic lanes.

The system shall provide real-time speed, volume, and occupancy data to the TSMC. Outputs shall be compatible with a 170 controller. The system shall provide data within 90% accuracy of 6' diameter induction loops. The temporary system shall operate continuously, day and night until the permanent system is accepted.

The Design-Builder shall schedule installation of the temporary detection system as a priority in the Contract Schedule. The temporary detection stations shall be installed with a maximum spacing of 1-mile throughout the length of the project, beginning at LR 165+00 and LL 375+00.

When no longer needed, the temporary detection system shall be removed in its entirety.

#### **2.18.4.5 Construction Requirements**

##### **2.18.4.5.1 General**

##### **Maintenance Responsibility**

The Design-Builder shall maintain and keep operational existing ITS devices for the duration of the Project. The Design-Builder shall be responsible for maintaining all ITS devices and infrastructure in the Project area starting at the commencement of construction activities. The date of commencement of construction will be set or announced at the Project Preconstruction Meeting. The Design-Builder shall retain maintenance responsibility for all devices until it has completed all Work through final acceptance of the Project.

##### **Testing of Existing Equipment**

To ensure that all existing equipment is in working order at a Site where the Design-Builder will work, the Design-Builder may request a meeting at each Site with the Department and the party with current maintenance responsibility. At this time all loops, cabling, connectors, and cabinet operations may be tested by the Design-Builder. The Design-Builder shall be responsible for requesting, coordinating, and conducting the on-site meeting, and for providing all labor, materials, test equipment, and test documentation. All testing shall be non-destructive. If the Design-Builder begins to work at a location without arranging this testing it will be assumed that all cabinet components and operations were in proper working order at that time, and the Design-Builder shall have the responsibility for complete and proper operation upon the Completion of its Work. If no pre-testing is completed, any equipment that is not functioning at the Completion of Work, will be assumed to have been working as of the date of Notice to Proceed, and must be replaced at the Design-Builder's expense.

**Existing Cables**

When new cables are to be installed into existing conduits containing existing cables, the Design-Builder shall remove the existing cables and reinstall the existing cables simultaneously with the new cables. The Design-Builder shall take every precaution to protect the existing cables. In the event of damage to the existing cables, the Design-Builder shall replace all damaged cables and terminations, in-kind, at no additional expense to the Department. No splicing shall be permitted except as allowed in RFP Appendix B3.18

**Existing Utilities**

The Design-Builder shall be responsible for locating and marking all underground utilities prior to any ITS installation Work.

**Use and Operation Prior to Acceptance**

The Department, as justified by public interest, may order some ITS elements to be placed into service before Substantial Completion of the Project. Such action shall not be deemed as acceptance of the Project in whole or in part.

WSDOT will approve and/or control all electronic displays that are potentially in the public view. No display of any kind or activation of any component shall be permitted without prior approval of WSDOT.

**Restoration**

The Design-Builder shall be responsible for complete restoration (before Substantial Completion) of all Work Sites to a like or better condition to the satisfaction of WSDOT. All grading, seeding, and mulching shall be in accordance with the prevailing standards of the agency with jurisdiction and with the requirements of Section 2.14.

**Verification of Usefulness**

When the Design-Builder elects to reuse existing conduit, ducts, and junction boxes, the Design-Builder shall be responsible for all verification of their availability and usefulness. Before the Design-Builder installs cabling into existing conduit, the Design-Builder shall thoroughly clean, blow, and brush out all conduit or ductwork runs to minimize damage to

cables during the installation process, and prove conduit integrity with the use of an approved mandrel.

### Damage and Delay

If damage to existing facilities inhibits the Design-Builder's progress of Work, the Design-Builder shall immediately notify the Department. The Design-Builder shall adjust its Work schedule to provide the Department with up to seven calendar days to resolve the situation; during that time, the Design-Builder shall retain responsibility for the Site maintenance and continued normal operations as directed by the Department. Damaged existing facilities shall not be deemed as justification for Project delay claims.

### Construction Schedule

The Design-Builder shall develop and implement into the Contract Schedule the ITS implementation schedule, which shall show the required sequence of all activities that must be completed prior to the initiation of other activities. The ITS implementation schedule shall address all major activities, components, and milestones of the ITS equipment installation and, at a minimum, include the following:

- Design reviews
- Equipment deliveries
- System element installation milestones:
- Traffic signal cabinets
- Metered ramp locations
- Non-metered ramp locations
- Traffic monitoring stations
- Freeway VMS
- Video surveillance locations
- Communications system
- Local testing
- Communications testing
- Acceptance
- Utilities coordination, design and construction

**Materials Furnished by Design-Builder** - The Design-Builder shall supply all material and equipment required for the complete installation of the various ITS elements.

The following table details the equipment that shall be purchased by the Design-Builder from the WSDOT at the price listed. The Contract will be back charged for the type and quantity of equipment purchased.

Equipment	Manufacturer	Model #	Link	Lead Time	Cost
<b>CCTV</b>					
~ Cabinet	US Traffic	334-WANAT		60 Days	\$3,685.00
~ Camera	COHU Inc.	3955-3100 PEDD	<a href="http://www.cohu-cameras.com">www.cohu-cameras.com</a>	30 days	\$5,176.00
		3965-3100 PEDD		30 days	\$3,029.00
~ Video Data Transmitter	Optelecom Inc	9225DT/SM-FC	<a href="http://www.optelecom.com">www.optelecom.com</a>	6 Weeks	\$1,600.00
~ Chassis	Optelecom Inc	9003-2	<a href="http://www.optelecom.com">www.optelecom.com</a>	1 Week	\$309.00

~ Fiber Optic Patch Panel	Generic				\$200.00
~ Power Supply for Chassis	Optelecom Inc	9010 PS	<a href="http://www.optelecom.com">www.optelecom.com</a>	1 Week	\$72.00
~ Fan					Included w/cabinet
~ Fluorescent Lamp					Included w/cabinet
~ Power Distribution Assembly					Included w/cabinet
~ Pull-out Drawers					Included w/cabinet
~ Hinged, Quick-Release Fuse Holder					Included w/cabinet
~ 100 Watt Strip Heater with Guard					Included w/cabinet
~ Miscellaneous Hardware					Included w/cabinet
<b>PTR</b>					
~ Cabinet	US Traffic	334-WANAT		60 Days	\$3,685.00
~ Chassis	Optelecom Inc	9003-2	<a href="http://www.optelecom.com">www.optelecom.com</a>	1 Week	\$309.00
~ Power Supply for Chassis	Optelecom Inc	9010 PS	<a href="http://www.optelecom.com">www.optelecom.com</a>	1 Week	\$72.00
~ Piezo Sensor				4 Weeks	\$853.00
~ Piezo Grout (1 bucket / 2 piezos)	ASA	475			\$120.00
~ Temperature Sensor				4 Weeks	\$200.00
~ 100 Watt Strip Heater with Guard					Included w/cabinet
~ 12 Position Terminal Blocks					Included w/cabinet
~ Fan					Included w/cabinet
~ Fluorescent Lamp					Included w/cabinet
~ Miscellaneous Hardware					Included w/cabinet
~ Power Distribution Assembly					Included w/cabinet
~ Pull-out Drawers and Shelf					Included w/cabinet
~ Type 66 Terminal Block					Included w/cabinet
<b>Data Accumulation and Ramp Meter</b>					
~ Cabinet	US Traffic	334-WANAT		60 Days	\$3,685.00
~ Drop / Insert Data Modem	Optelecom Inc	9522-LD-FC	<a href="http://www.optelecom.com">www.optelecom.com</a>	6 Weeks	\$2,310.00
~ Controller	McCain Traffic	170E (170 ATC/HC11)		60 Days	\$788.00
~ Display Panel	US Traffic			60 Days	\$500.00
~ Chassis	Optelecom Inc	9003-2	<a href="http://www.optelecom.com">www.optelecom.com</a>	1 Week	\$309.00
~ Fiber Optic Patch Panel	Generic				\$200.00
~ Power Supply for Chassis	Optelecom Inc	9010 PS		1 Week	\$72.00
~ Sign Flasher Unit	US Traffic	204 (?)			\$25.00
~ Fan					Included w/cabinet
~ Fluorescent Lamp					Included w/cabinet
~ Power Distribution Assembly					Included w/cabinet
~ Pull-out Drawers					Included w/cabinet
~ 100 Watt Strip Heater with Guard					Included w/cabinet
~ Miscellaneous Hardware					Included w/cabinet
~ Input Files					Included w/cabinet
<b>HAR</b>					
~ Cabinet	US Traffic	334-WANAT		60 Days	\$3,685.00
~ Drop / Insert Data Modem	Optelecom Inc	9522-LD-FC	<a href="http://www.optelecom.com">www.optelecom.com</a>	6 Weeks	\$1,600.00
~ Controller	McCain Traffic	170E (170 ATC/HC11)			\$788.00
~ Chassis	Optelecom Inc	9003-2	<a href="http://www.optelecom.com">www.optelecom.com</a>	1 Week	\$309.00
~ Fiber Optic Patch Panel	Generic				\$200.00
~ Power Supply for Chassis	Optelecom Inc	9010 PS		1 Week	\$72.00

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2.18 INTELLIGENT TRANSPORTATION SYSTEM  
(ITS)

~ Sign Flasher Unit	US Traffic	204 (?)		60 Days	\$25.00
~ 100 Watt Strip Heater with Guard					Included w/cabinet
~ Miscellaneous Hardware					Included w/cabinet
~ Fan					Included w/cabinet
~ Fluorescent Lamp					Included w/cabinet
~ Power Distribution Assembly					Included w/cabinet
~ Pull-out Drawers					Included w/cabinet
~ Breaker Panel					Included w/cabinet
<b>VMS</b>					
~ VMS Sign	Daktronics	VF-27X105-18-W		120 Days	\$82,000.00
~ Sign Display					Included w/ VMS
~ VMS Sign Beacons					Included w/ VMS
~ Sign Housing					Included w/ VMS
~ Sign Mounting Hardware*					Some Included w/ VMS*
~ VMS Cabinet					Included w/ VMS
~ Control System					Included w/ VMS
~ Display LEDs					Included w/ VMS
~ Power Supplies					Included w/ VMS
~ VMS Sign Controller					Included w/ VMS
~ Control Software					Included w/ VMS
~ VMS Training					Included w/ VMS
~ Chassis					Included w/ VMS
~ Power Supply for Chassis					Included w/ VMS
~ Fan					Included w/ VMS
~ Fluorescent Lamp					Included w/ VMS
~ Power Distribution Assembly					Included w/ VMS
~ Pull-out Drawers					Included w/ VMS
~ 100 Watt Strip Heater with Guard					Included w/ VMS
~ Fiber Optic Patch Panel	Generic				\$200.00
~ Drop / Insert Data Modem	Optelecom Inc	9522-LD-FC	<a href="http://www.optelecom.com">www.optelecom.com</a>	6 Weeks	\$2,310.00
*See Appendix B3.18.4.2.4 for information on what shall be provided by the Design-Builder.					

The Design-Builder shall be responsible for all equipment and labor required for the loading, securing, and transportation of devices from the WSDOT Signals Shop. The Design-Builder shall be responsible for the devices once the loading begins. All damage resulting from the Design-Builder's operation shall be repaired or replaced, to WSDOT's satisfaction, at the Design-Builder's expense with no cost being incurred by WSDOT.

**Similar Material and Equipment** - Each type of material and equipment to be installed by the Design-Builder shall be the same model and made by the same manufacturer, and must be compatible with existing WSDOT standards and communication protocols.

All cabinets containing similar equipment shall be configured and wired identically, including but not limited to internal wiring and harnesses, wiring color codes, terminal block

positions, termination strips, power service configuration, panel and equipment mounting locations. For master details see RFP Appendix C3.18.

**Conduit and Junction Box** - All conduit and junction box installations shall be designed, furnished, and installed in accordance with prevailing WSDOT standards.

**Incidental Materials** - All incidental materials shall be furnished by the Design-Builder in accordance with the prevailing standards of the agency with jurisdiction over the facility where the equipment is located.

#### **2.18.4.5.2 CCTV Systems**

The CCTV System shall be in accordance with RFP Appendix B3.18.2 “Closed Circuit Television System”.

The Design-Builder shall test the CCTV systems in accordance with RFP Appendix B3.18.2.3.1 “CCTV Test”.

#### **2.18.4.5.3 Ramp Metering Systems**

The Ramp Metering System shall be in accordance with RFP Appendix B3.18.3 “Traffic Data and Ramp Metering System”.

#### **Ramp Control Signal Foundation**

The Design-Builder shall comply with WSDOT Standard Plan J-7a when constructing the RCS foundation.

Testing for Loop Detectors shall be in accordance with RFP Appendix B3.18.3.2.2.3 “Test for Induction Loops and Lead-in Cable”.

#### **2.18.4.5.4 Data Stations Systems**

The Data Station System shall be in accordance with RFP Appendix B3.18.3 “Traffic Data and Ramp Metering System”.

Testing for Loop Detectors shall be in accordance with RFP Appendix B3.18.3.2.2.3 “Test for Induction Loops and Lead-in Cable”.

#### **2.18.4.5.5 Variable Message Signs (VMS)**

The Design-Builder shall install power and communications cable conduits within the support structure. The Design-Builder shall install power and communications cables between the variable message signs (VMS) and the control cabinet.

The VMS shall be in accordance with RFP Appendix B3.18.4 “Variable Message Sign (VMS)”.

#### **2.18.4.5.6 Highway Advisory Radio Signs (HARS)**

The HARS shall be in accordance with RFP Appendix B3.18.5 “Highway Advisory Radio Sign (HARS)”.

Construction of the HARS shall be in accordance with RFP Appendix B3.18.5.3 “Construction Requirements”.

#### **2.18.4.5.7 Highway Advisory Radio Transmitters (HART)**

The HART shall be in accordance with RFP Appendix B3.18.6 “Highway Advisory Radio Transmitter (HART)”.

Construction of the HART shall be in accordance with RFP Appendix B3.18.6.3 “Highway Advisory Radio Transmitter (HART)” IHART.DT1

#### **2.18.4.5.8 Communication Conduit System**

The Communication Conduit System shall be in accordance with RFP Appendix B3.18.7 “Communication Conduit System”.

The Communication Conduit System shall be in accordance with RFP Appendix B3.18.7.3 “Construction Requirements”.

Pull Boxes shall be in accordance with RFP Appendix B3.18.7.2.2 “Cable Vaults and Pull Boxes”.

#### **2.18.4.5.9 Communication Cable and Interface Systems**

The Communication Cable and Interface System shall be in accordance with RFP Appendix B3.18.8 “Communication Cable and Interface System”.

New 48-strand and 36-strand single mode fiber optic cables extending from the south (existing communication hub near LR STA 190+00) to the north (south bridge seat of the Snohomish River bridge) shall be installed. New 36 strand cables shall also be installed on SR 526 and US 2 to connect to the new CCTV and data stations. Fiber optic interface (cable termination and patch panels) shall be provided at new and existing Communication Hub as well as all ITS cabinets.

#### **Fiber-Optic Cable Installation**

The fiber optic cable shall be install in accordance with RFP Appendix B3.18.8.3.2 “Cable Installation – General” and RFP Appendix B3.18.8.3.2.2 “Fiber Optic Cable Installation”.

Lubricant for cable installation shall be in accordance with RFP Appendix B3.18.8.2.4 “Fiber Optic Cable Lubricant”.

Racking of cable shall be in accordance with RFP Appendix B3.18.8.3.6 “Cable Racking in Pull Boxes and Cable Vaults”.

Fiber optic cable shall be labeled in accordance with RFP Appendix B3.18.8.3.4 “Fiber Optic Cable Labeling”.

#### **Fiber-Optic Cable Splicing**

Fiber optic cable shall be spliced in accordance with RFP Appendix B3.18.8.3.2.2 “Fiber Optic Cable Splicing”.

#### **Testing**

Testing shall be in accordance with RFP Appendix B3.18.8.3.8 “Fiber Optic Cable Testing”.

### **2.18.4.5.10 Video, Voice & Data Distribution and Transmission Systems**

The Video, Voice & Data Distribution and Transmission Systems shall be in accordance with RFP Appendix B3.18.9 “Video, Voice, & Data Distribution and Transmission Systems”.

### **2.18.4.5.11 Communication Hub**

The Design-Builder shall have 1 weekend from 8:00 p.m. Friday to 4:00 a.m. Monday, to perform the cutover to the new Hub. All ITS equipment from the existing Hub shall be installed and existing devices, including the temporary CCTV, shall be operational by the end of the allotted time. Testing of the active fibers shall be performed during the cutover to verify the splices. The testing of the inactive fiber may be performed after the allotted time without penalty. Liquidated damages in accordance with Appendix B3.18.1 will be applicable.

The Communication Hub shall be in accordance with RFP Appendix B3.18.10 “Communication Hub / Concrete Universal Enclosure (CUE)”.

### **2.18.4.5.12 Permanent Traffic Recorder Station**

There is an existing PTR Station at approximate station LL STA 623+00 (Pacific Ave. On-Ramp to SB I-5.) It shall be replaced using the applicable details and requirements of this RFP.

The PTR Station shall be in accordance with RFP Appendix B3.18.11 “Permanent Traffic Recorder Station”.

The design and installation of the PTR shall be as shown in RFP Appendix C3.18.

**2.18.4.5.13 Environmental Sensor Stations**

The Environmental Sensor Station shall be designed and constructed in accordance with RFP Appendix B3.18.12 “Environmental Sensor Station”.

**2.18.4.5.14 Temporary ITS Systems**

Construction of the devices described in Section 2.18.1.15 shall be identified as a priority activity in the Contract Schedule.

**2.18.4.6 ITS Testing****2.18.4.6.1 General**

Once the ITS devices are installed, a 30-Calendar-Day reliability test shall take place. If the ITS devices and system perform trouble free for 30 Calendar Days of continuous operation, testing may stop. If not, repairs shall be made and a second 30-Calendar-Day test shall be conducted.

The Design-Builder shall have current training and certification on all testing equipment used. The Design-Builder shall provide documentary evidence that the instruments used for testing have been calibrated per the instrument manufacturer’s specifications within the last 12 months. The Design-Builder shall have all testing equipment calibrated yearly for the life of the Contract. Measurements recorded during the tests shall be supplied to WSDOT.

The Design-Builder shall have in its possession a certification of test device calibration (American National Standards Institute [ANSI] specified guidelines) used to measure electrical and insulation characteristics of power and signal control cables and calibration documentation of optical cable test equipment. (ANSI guidelines call for annual calibration of test equipment.)

Depending on the construction schedule, highway ITS components may be installed and operational and later relocated. Highway ITS components shall undergo all series of tests when relocated.

In addition to the individual testing requirements detailed in their respective sub-sections, the ITS shall undergo the following tests:

**2.18.4.6.2 Pre-Installation Test (PIT)**

The Design-Builder shall perform a pre-installation test (PIT) on all ITS devices supplied under the Contract. The purpose of the PIT is to ensure that all ITS devices meet the requirements of the Contract prior to leaving the storage and testing facility.

The PIT shall be completed and all results must be accepted by WSDOT prior to installation of ITS devices. The PIT test shall include the following:

- PIT overview (objectives of the test, relationship to other tests)
- Test equipment to be used (including calibration certificates)
- Setup of test environment
- Specific methodology for each test to be completed

The Design-Builder shall obtain WSDOT Approval of the PIT test procedures. Specific PIT requirements shall include:

- Visual Inspection: The Design-Builder shall perform detailed visual inspection to confirm that the ITS devices are in compliance with the requirements of this Contract.
- Functional Testing: The Design-Builder shall perform tests to demonstrate that all functional requirements are in compliance with the Contract, in addition to all environmental testing.

For standard off-the-shelf products, submission of a warranty certificate may be used as an alternative to a PIT.

#### **2.18.4.6.3 Proof of Performance Test (POP)**

The proof of performance (POP) test shall be completed by the Design-Builder on fiber-optic cable links and each electrical system supplied for this Contract, following installation and prior to ITS devices becoming operational. POP tests shall verify that the subsystem is fully functional under local control, usually independently from other portions of the Work. The POP test shall verify all essential operational features of the installed component on a stand-alone basis.

The POP test shall be performed for all highway ITS devices at each Site location.

The Design-Builder shall obtain WSDOT approval of the POP test procedures prior to commencing with the POP test.

The POP test shall be performed for all highway ITS devices at each Site location. If the ITS devices and system perform trouble free for 30 Calendar Days of continuous operation, testing may stop. If not, repairs shall be made and a second 30-Calendar-Day test shall be conducted.

#### **2.18.4.6.4 System Integration Test (SIT)**

Following completion of all POP tests, the Design-Builder shall conduct a system integration test (SIT) for acceptance by WSDOT to demonstrate and verify the full functionality and integrated operability of all portions of the system.

The Design-Builder shall obtain WSDOT Approval of the SIT test procedures prior to commencing with the SIT.

This testing shall demonstrate successful interface of all ITS devices, ramp metering control system, and TSMC computer systems, with applicable local jurisdiction systems and with ITS devices installed in previous highway ITS implementation Projects.

Completion of the SIT shall include a 60-Day burn-in period. WSDOT shall be provided with access to all ITS devices during this period for purposes of verifying operations. The Design-Builder shall log all ITS device failures and their method of repair during this period and provide this log to WSDOT prior to SIT acceptance. The highway ITS devices shall exhibit a failure rate lower than what is expected during final operation during the entire burn-in period. Only failures due to activities of others, power failures, or traffic accidents are expected. The burn-in may be repeated if other failures are experienced.

Following acceptance of the SIT, the system shall be put into service and the system performance monitored for not less than six months to verify system reliability in an operating environment. Any failures and defects occurring during this period shall be documented. Any serious defects that affect the functionality or availability of the system will be a basis for restarting the SIT, at which time performance shall be monitored for not less than 14 Days. ITS acceptance will not occur until the monitoring period is completed.

#### **2.18.4.6.5 Cabinet and Component Testing**

Cabinet testing shall be in accordance with RFP Appendix B3.18.3.2.1 “Model 330 & Model 334 Cabinet Testing”.

#### **2.18.4.6.6 Loop Detector Testing and Setup**

The Design-Builder shall notify WSDOT prior to beginning loop detector testing. A WSDOT representative may observe each test.

Loop detector testing shall be in accordance with RFP Appendix B3.18.3.2.2.3 “Test for Induction Loops and Lead-in Cable”.

#### **2.18.4.6.7 Fiber Optic Cable Testing**

The Design-Builder shall notify WSDOT prior to beginning fiber-optic system testing. A WSDOT representative may observe each test.

Fiber Optic Testing shall be in accordance with RFP Appendix B3.18.8.3.8 “Fiber Optic Cable Testing”.

#### **2.18.4.6.8 Power and Control Cable Testing**

The Design-Builder shall test power and control cables according to the requirements of Standard Specification Section 8-20.3(11) (RFP Appendix B5).

#### **2.18.4.6.9 Charge for WSDOT Trouble Shooting**

WSDOT personnel will be available to trouble shoot problems with the ITS. WSDOT will back charge the Design-Builder at a rate of \$75/hour for labor and travel costs when the cause of failure resulted from the Design-Builder.

#### **2.18.5 Warranty of Work**

The Design-Builder shall warranty its ITS Work in accordance with Section 2.30 and RFP Appendix B3.18.

WSDOT warrants all Department-furnished items; however, WSDOT will review claims under such warranty to confirm their validity.

#### **2.18.6 Maintenance During Construction**

The Design-Builder shall maintain the new and existing ITS per Section 2.27.5.2.

#### **2.18.7 Submittals and Reviews**

##### **2.18.7.1 Design Reviews**

Design reviews shall be in accordance with Section 2.26.5, and the submittal requirements below shall be incorporated into the requirements of Section 2.26.5. These supplemental requirements shall apply to submittals for certain ITS equipment.

##### ***Oversight Review***

The Design-Builder shall have available for review and inspection an overall regional system location map showing all proposed locations for ITS equipment, how the equipment locations interrelate to form the ITS, and how the equipment connects to the existing ITS infrastructure. The following items are related to the design and installation of the required ITS equipment.

**a) Ramp Locations.** The Design-Builder's designs and plans shall include a site-specific plan view identifying the location of all infrastructure related to each metered and non-metered ramp location. This information shall include, at a minimum, all utility information, pole locations and details, signal assemblies, location of warning and advisory signs, location and orientation of controller cabinet, size and location of detection zones, location of power service and disconnect, striping, and a distinction between new and existing equipment.

**b) Data Stations.** The Design-Builder shall have a complete listing of all monitoring stations within the Project area, and a determination of the final location of each station.

The Design-Builder's Designs Documents shall include a plan view identifying the location of all infrastructure related to a given traffic monitoring station, including, at a minimum, all existing utility information, the location and size of detection zones, conduit and junction box

locations, location and orientation of controller cabinet, location of power source and disconnect, and a distinction between new and existing equipment.

**c) *Video Surveillance Locations.*** The Design-Builder shall have a complete listing of all video surveillance locations within the Project area, and a determination of the final location of each camera. The Design-Builder shall provide mapping which identifies the proposed viewing areas of each camera location in the Project construction area.

The Design-Builder's designs and plans shall include a plan view identifying the location of all infrastructure related to a given video surveillance location. This infrastructure shall include, at a minimum, the existing utility information, the location and height of camera pole, conduit and junction box locations, location and orientation of equipment cabinet, location of power source and disconnect, and a distinction between new and existing equipment.

**d) *Sign Locations.*** For new and relocated VMS, the Design-Builder shall have a complete listing of all VMS locations within the Project area including other freeway locations, and a determination of the final location of each sign. The Design-Builder's design and plans for freeway VMS shall include the following information:

- A plan view identifying the location of all infrastructure related to a given sign location (existing utilities, pole, local access point, equipment cabinets, conduit, and junction boxes).
- A plan view identifying the proposed area available to motorists to view each sign.
- A cross-section showing the relationship of the sign to the travel lanes and the elevation of the road surface, the bottom and top of the sign, and the vertical sign supports.

**e) *Communications System.*** The Design-Builder's design and plans for the Fiber Optic Communications System shall include the following information:

- Block and system diagrams shall be submitted detailing the entire fiber optic backbone communications system.
- A separate single line block and system diagram shall be submitted for each of the two subsystems (voice/data and video) and for the fiber optic backbone communications system.
- A block diagram shall be submitted showing the interconnection between major independent elements, such as fiber optic cable, optical patch cord, fiber optic multiplexer, channel bank and distribution frames.
- A separate single line block diagram shall be submitted for system and distribution nodes and for every other category of nodal facility.
- Proposed manufacturer's detailed product data "cut-sheets" and specifications for each piece of equipment shall be submitted.
- Schematic diagrams and location maps of all individual backbone system links and distribution loops shall be submitted.
- Wiring diagrams of distribution frames, equipment racks, and the fiber optic cable shall be submitted.

### **2.18.7.2 Construction Reviews**

### **2.18.7.3 Documentation**

Plan submittals shall be made in accordance with Section 2.1.6.

The Design-Builder shall submit approved final plans as originally signed and stamped to the Department. Design-Builder shall include ten copies of 11"x17" (or metric equivalent) drawings and a copy of the computer files, and include three copies of calculations and specifications for any ITS elements. Design-Builder shall submit As-Built Plans with shop drawings for each electrical cabinet.

The Design-Builder shall furnish six sets of factory-issued manuals containing all technical information on each piece of Design-Builder-furnished equipment installed. Acceptable factory manuals shall contain technical, diagnostic, and maintenance (preventive and troubleshooting) information. Advertising brochures and catalog cuts will not be accepted.

#### **ITS Plan Submittals**

The Core ITS Plan shall be submitted for approval 20 Days after the ITS design workshop. WSDOT will respond within 10 Business Days of receipt of the Core ITS Plan.

The Design-Builder shall submit the Fiber-Optic System Test Plan for approval. WSDOT will respond within 10 Business Days of receipt of the Fiber-Optic System Test Plan.

Training course documentation shall be submitted to WSDOT for approval two weeks prior to the date of the proposed training course.

#### **Released for Construction (RFC) Documents Plans**

Plans shall, at a minimum, include the following:

- Title sheet
- Legend of symbols (WSDOT convention)
- Existing components with utilities
- Proposed ITS devices with GPS locations
- Communication schematics
- Component details
- Quantity tabulations

#### **Component, Test, and Project Documentation**

The Design-Builder shall prepare and submit component, test, and Project documentation. The test documentation shall include completed forms and electronic documentation. Two sets of component and test documentation shall be submitted directly to WSDOT for acceptance.

Two sets of component documentation shall be required; one set for the WSDOT Engineer and one set for the WSDOT ITS Integration Engineer.

The Design-Builder shall obtain WSDOT acceptance of the ITS component submittal package before installation of the ITS components will be authorized.

The Design-Builder shall notify WSDOT when all ITS requirements have been met. WSDOT will accept such Work only after verifying proper operation of all components.

The Design-Builder shall submit to WSDOT for approval detailed pre-installation test (PIT) procedures in accordance with standard testing procedures at least two weeks before the commencement of the test. The Design-Builder shall submit the PIT results to WSDOT for Approval at least two weeks prior to the scheduled installation of the equipment.

The Design-Builder shall submit the loop detector test report to WSDOT within one week after completing installation for both the preformed and saw cut loops.

The Design-Builder shall submit all wiring diagrams for review to WSDOT and incorporate all comments in the wiring diagram.

The Design-Builder shall submit power and control cable test results to WSDOT within one week of making final connections.

#### **Fiber-Optic Cable Test Documentation**

The Design-Builder shall submit fiber-optic cable test documentation including calibration and certification of the fiber-optic cable test equipment as part of the component documentation.

The Design-Builder shall provide all test documentation both in hardcopy format and on a CD in accordance with RFP Appendix B3.18.8.3.8 “Fiber Optic Cable Testing”.

The Design-Builder shall store OTDR files under a directory named by the highway number. These files shall include the following: actual date of testing, all splice points marked, the “index of refraction” (recorded on the cable spool by the manufacturer), and file names and notes as described by WSDOT’s file naming convention.

The Design-Builder shall provide a test summary describing the final measurements out of range, any approved changes in specified methods, and actual dates of tests performed by both power meter and OTDR.

The Design-Builder shall provide the WSDOT ITS Integration Engineer with two copies of the manufacturer’s reel (spool) test documentation. The test documentation is shipped with the fiber-optic cable spool.

## 2.19 DELINEATIONS OR PAVEMENT MARKING

### 2.19.1 General

The Design-Builder shall prepare pavement-marking plans that show all striping delineations in accordance with the WSDOT Standard Plans RFP Appendix C, RFP, and the NWR Striping and signing Guidelines:

<http://wwwi.wsdot.wa.gov/regions/Northwest/Traffic/TrafficOps/Redbook.htm>.

### 2.19.2 Mandatory Standards and Reference Documents

#### 2.19.2.1 Mandatory Standards

**General.** Design-Builder shall develop and implement the MOT plan in accordance with the requirements of the Mandatory Standards listed in Table 2.19.2.1. The documents in Table 2.19.2.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.19.2.1**  
**Mandatory Standards for Pavement Markings**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	N/A		Proposal
2	WSDOT	<i>NWR Striping and signing Guidelines</i>	N/A	2002	<i>Red Book</i>
3	WSDOT	<i>Standard Plans for Roads, Bridge and Municipal Construction</i>	M21-01	2004	RFP Appendix C
4	FHWA	<i>Manual On Uniform Traffic Control Devices (Millennium Edition)</i>			MUTCD
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					

### 2.19.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.19.2.2 as supplementary guidelines for the design and implementation of the MOT plan. These Reference Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.19.2.2**  
**Reference Documents for Pavement Markings**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	<i>Design Manual For Design Build Projects</i>	MS22-02	2004	(RFP Appendix Z)
WSDOT	<i>Traffic Manual</i>	MS1-02		

### 2.19.3 Design Requirements

The Design-Builder shall prepare permanent pavement marking plans that show center striping, edge striping, lane line striping, arrows, legends, symbols, object markers, delineation, and other markings consistent with the needs of the Project.

#### Main Line and Ramps

Profiled Type D Methyl Methacrylate Pavement Markings shall be used for delineations.

#### Local Roads

Design-Builder shall use the local agency requirements for the pavement marking material on the local roads and limits out side of WSDOT Right of Way.

## 2.20 MAINTENANCE OF TRAFFIC (MOT)

### 2.20.1 General

The Design-Builder shall conduct all Work necessary to meet the requirements associated with maintenance of traffic (MOT), including providing for the safe and efficient movement of people, goods, and services through and around the Project while minimizing negative impacts to residents, commuters, and businesses.

Design-Builder shall begin maintenance of traffic activities at the start of construction Work (including preparatory MOT Work), or when first hauling construction materials and/or equipment, whichever is earliest, and shall continue MOT activities until Physical Completion of the Project.

## 2.20.2 Mandatory Standards and Reference Documents

### 2.20.2.1 Mandatory Standards

**General.** Design-Builder shall develop and implement the MOT plan in accordance with the requirements of the Mandatory Standards listed in Table 2.20.1. The documents in Table 2.20.1 are listed in order of priority.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.20.1**

#### Mandatory Standards for Maintenance of Traffic

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	n/a		Proposal
2	WSDOT	<i>Work Zone Traffic Control Guidelines</i>	MS54-44		
3	AASHTO	<i>A Policy on Geometric Design of Highways and Streets</i>	S99-GDHS-3	2001	"Green Book"
4	WSDOT	<i>MUTCD-Washington State Modifications.</i>	MS24-61		
5	FHWA	<i>Manual on Uniform Traffic Control Devices (Millennium Edition)—in particular, Part VI (Temporary Traffic Controls)</i>	MUTCD		MUTCD
6	WSDOT	<i>Sign Fabrication Manual</i>	M55-05		

\*\* Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.

### 2.20.2.2 Reference Documents

Design-Builder may use the Reference Documents listed in Table 2.20.2 as supplementary guidelines for the design and implementation of the MOT plan. These Reference Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.20.2**

#### Reference Documents for Maintenance of Traffic

Author or	Title	Document or	Date	Comments, Short
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Agency		Report No.		Forms
FHWA	National Cooperative Highway Research Program (NCHRP)	350		N/A
AASHTO	<i>Roadside Design Guide</i>	S99-RSDG-3	2002	n/a
WSDOT	<i>Design Manual For Design Build Projects</i>	M22-02	2004	DM
WSDOT	<i>Traffic Manual</i>	MS1-02	**	

### 2.20.2.3 Conformance to Established Standards

Flagging, signs, and all other traffic control devices and procedures furnished or provided shall conform to the standards established in the latest adopted edition of the Manual On Uniform Traffic Control Devices for Streets and Highways (MUTCD,) published by the U.S. Department of Transportation and the Washington State Modifications to the MUTCD. The devices furnished shall meet the quality standards identified in the Quality Standards for Work Zone Traffic Control Devices, published by the American Traffic Safety Services Association. Copies of the MUTCD may be purchased from the Superintendent of Documents, U.S. Government Printing Office, Washington, D.C. 20402. The Washington State Modifications to the MUTCD and Quality Standards for Work Zone Traffic Control Devices may be obtained from the WSDOT, Olympia, Washington 98504.

The condition of signs and traffic control devices shall be new or “acceptable” as defined in the book Quality Standards for Work Zone Traffic Control Devices, and will be accepted based on a visual inspection by the WSDOT Engineer. The WSDOT Engineer’s decision on the condition of a sign or traffic control device shall be final. A sign or traffic control device determined to be “not acceptable” shall be removed from the Project and replaced within 12 hours.

## 2.20.3 Performance Requirements

### 2.20.3.1 Personnel

***Traffic Engineer Manager Duties.*** Design-Builder shall provide a traffic engineer at Notice to Proceed to:

- Coordinate construction activities with the Department (including its Traffic Operations Center [TOC]);
- Implement traffic management strategies;
- Prepare an MOT report to the Department with each change in traffic phasing; and
- Be continuously available during the construction schedule until Substantial Completion of the Project and elimination of all construction traffic control.

***Traffic Engineer Manager Qualifications.*** Within ten days of Notice to Proceed, Design-Builder shall obtain Department approval of the person named as traffic engineer. Establish that the education and professional experience of the traffic engineer meet the following minimum qualifications:

- Bachelor of Science degree in civil engineering with an emphasis in traffic engineering
- Professional Engineer licensed in Washington State
- Ten years of practical experience with consulting firms, city, county, or state transportation agencies

***Traffic Control Supervisor.***

The Design-Builder shall provide a Traffic Control Supervisor (TCS) to manage and monitor all MOT operations for the duration of the construction. The TCS will be considered a critical component of the Design-Builder's management team and must have prior experience managing MOT operations on similarly complex projects. The TCS shall maintain current Evergreen Safety or Labors Union Traffic Control Supervisor Certification. Registration as a licensed professional engineer is not required. The TCS shall also coordinate activities with the public information officer.

The TCS or his designate shall be available on a 24-hour per day basis with a single contact phone number throughout the duration of the Project, must supervise and verify all changes in the MOT setup, and perform daily Project reviews to verify that MOT devices are correctly placed and traffic is safely and efficiently moving through the Project. The TCS or his designate shall be available on the Site within 45 minutes of notification of an emergency situation and be prepared to positively respond to the need to repair the Work zone traffic control or to provide alternate traffic arrangements. The TCS shall have enough authority and resources to immediately correct any deficiencies discovered or to demobilize any construction operation that is resulting in excessive delays to traffic or creating an unsafe condition.

The TCS shall maintain a seven-day advance schedule of all traffic control activities and a long-range schedule for all planned ramp or roadway closures.

The TCS shall perform drive-through inspections each Calendar Day and immediately after any shift in MOT setup while crews are still on Site to make modifications. If the Project has signalized intersections, the review shall be done prior to during AM peak hours each day, and each signal cycle shall be reviewed. At least two of the daily inspections each week must be performed at night so that the arrangement and condition of the lights can be reviewed. The inspections shall also include assurances that pedestrians and bicyclists have a safe travel path around or through the Work Site and that existing businesses have adequate access during business hours, if applicable. The results of the inspections shall be documented in a daily report that, at a minimum, lists the exact time frame of the drive-through inspection and the defects noted. The report shall also document any maintenance or corrective action ordered as a result of the inspection and the name and position of the Design-Builder personnel directed to provide the maintenance or corrective action. The daily report shall state that the MOT setup and all traffic control devices are in substantial conformance with the Contract requirements except as noted and shall be signed by the TCS.

**2.20.3.2 Maintenance of Traffic Plans**

Design-Builder's MOT Plans shall, among other things, consider, the following:

- Procedures to identify and incorporate the needs of transit operators, Utility Owners, schools, and business owners in the Project corridor.
- Procedures for obtaining acceptance and implementing road and lane closures.
- Process for developing and obtaining acceptance by stakeholders of switching procedures.
- Procedures to identify and incorporate the needs of traffic engineering agencies affected by the Work.
- Process for signing transitions during construction from one stage to the next and from interim to permanent signing.
- Procedures to identify and incorporate the needs of emergency service providers, law enforcement entities, and other related corridor users, as well as procedures to ensure all information needed by these agencies to protect the public is available.
- Provisions for Incident Response Team and emergency response.
- Process to identify, produce, and receive acceptance for designs of any necessary temporary traffic signals.
- Methods and frequency of inspection and maintenance of all traffic control throughout the Project's limits.
- Descriptions of contact methods, personnel available, and response times for responses to any conditions needing attention during off-hours. Design-Builder shall include a communications plan to WSDOT radio and field offices.
- Identification of measurable limits for the repair and replacement of traffic control devices, including pavement markings.
- Process to determine the need for revised traffic signal timings, and if revisions are required, detail the procedures for the development, Approval, implementation, testing, and maintenance of all affected signals.
- Process to determine if a courtesy patrol or other measure is needed to aid the traffic control in the corridor.
- Provisions to maintain existing access to all properties within the Project limits for the duration of the Project, except as provided by other sections. Appropriate information about access modifications shall be made available to the appropriate parties.
- Provisions to provide continuous access to established truck routes, hazardous material (HazMat) routes, transit routes and school bus routes.
- Procedures to modify the plans as needed to adapt to current Project circumstances.
- Procedures to determine detour routes and for obtaining acceptance from all stakeholders for all proposed detour routes.
- Procedures to communicate MOT information to the Design-Builder's public information personnel and notify the public of maintenance of traffic issues in conjunction with the requirements of Section 2.9.
- Procedure to accommodate adjoining project's MOT plans if applicable.
- Procedure to accommodate the MOT plans when the staging schedule of the Project or any adjoining project changes.
- Temporary breaks in Limited Access lines and utilization of breaks in Limited Access line.

### **2.20.3.3 MOT Task Force**

#### ***MOT Task Force Members***

The Design-Builder and WSDOT shall establish an MOT task force. The MOT Task Force shall develop a schedule for meetings and coordination during the Project from the Notice to Proceed to Physical Completion.

The MOT task force will serve as an advisory committee to the Design-Builder. The Design-Builder shall consider all recommendations and input provided by the task force; however final design and implementation remains the responsibility of the Design-Builder. Temporary breaks in the Limited Access lines and utilization of the breaks require concurrence by the Department.

The Design-Builder shall deliver to WSDOT a list of all parties invited to take part in the MOT task force and the responses to all the invitations. Preliminary agendas shall be provided to all invitees a minimum of two (2) Business Days prior to each meeting.

A copy of the MOT diary shall be submitted to WSDOT on a monthly basis. Upon Physical Completion of the Project, the MOT diaries shall be delivered to and become the property of WSDOT.

#### ***Meeting***

The Design-Builder shall chair MOT task force meetings. The meeting schedule and frequency may be adjusted upon the agreement of the MOT task force members. The purpose of the meetings shall be to:

- Further refine and develop the MOT plans and strategies.
- Review the Design-Builder's MOT details.
- Disseminate Project MOT information to task force meeting attendees.
- Obtain MOT input from task force meeting attendees.
- Develop, refine, and review the TMP and its implementation.
- Take meeting minutes and distribute them to the task force members there by the following Working Day.

### **2.20.4 Design and Construction Criteria**

#### **2.20.4.1 Design Requirements**

The Design-Builder shall develop MOT plans that provide for all construction stages and phasing and identify opportunities to expedite construction throughout the course of the Project. The MOT plans shall be prepared under the direction of the Design-Builder's Traffic Engineering Manager.

All construction signs, flaggers, spotters and other traffic control devices shall be shown on the traffic control plan(s) except for emergency situations. Where mainline traffic controls plans are developed with the intent of operating without the use of flaggers or spotters, the plans shall note that intent. The use of flaggers or spotters to supplement these traffic control plans will not be allowed except in a case where no other means of traffic control can be used or in the event of an emergency. The modified plans must show locations for all required advance warning signs and a safe, protected location for the flagging station. If flagging is to

be performed during hours of darkness, the plan must include appropriate illumination for the flagging station.

The plans shall show the necessary construction signs, flaggers, spotters and other traffic control devices required to support the Work. The Design-Builder's submittal shall be provided to the WSDOT for review and comment at least ten business days in advance of the time the signs and other traffic control devices are scheduled to be installed and utilized. The Design-Builder shall be solely responsible for submitting any proposed traffic control plan or modification, obtaining the WSDOT Engineer's approval and providing copies of the approved Traffic Control Plans to the Traffic Control Supervisor.

The Design-Builder's MOT plans shall include, at a minimum, the following items:

- Complete plan sheets and details for all stages of construction.
- The appropriate details when temporary construction of any of the following is required to maintain traffic: traffic signals, detour roadways, bridges, retaining structures, drainage, and other miscellaneous construction.
- Roadway plan sheets showing all traffic control devices that are in place that need to be retained, relocated, or removed and all temporary traffic control devices that need to be installed, retained, relocated, or removed.
- The spacing, size, color (legend and background, if applicable) and quantity of all traffic control devices.
- Access to the Work zones, ingress and egress for construction vehicles.
- Roadway plan sheets with the location of each sign so it can be easily read in relation to the roadway and other traffic control devices. A small scale layout of each sign shall be shown on the corresponding roadway plan sheet where the sign is to be placed.
- Provisions for using temporary guardrail, temporary concrete barrier wall, or attenuators to satisfy clear zone requirements and to protect the traveling public and Design-Builder' personnel.
- Temporary lighting, temporary signalization and temporary ITS details, as required. The Design-Builder shall refer to additional requirements stated within the respective sections in addition to the requirements herein.
- Signing plan sheets shall include layouts showing the locations of ground-mounted and overhead signs, special sign details, clear zones and structural and foundation requirements.
- Drawings on how to fabricate any sign not detailed in the WSDOT *Sign Fabrication Manual* showing dimensions, the background color, and the legend.
- Methods for covering, partially covering or modifying signs when not applicable to the current phase.
- Pavement marking plan sheets shall include striping, crosswalks, intersection details, and traffic delineators.
- Type and location of all pavement markings to be installed, removed, or renewed for each stage and placement location of the final pavement markings.
- Access and control of bicyclists and pedestrians including persons with disabilities in accordance with the Americans with Disabilities Act of 1990 (ADA) through the traffic control zones shall be included on the plans.
- Detail modifications to the Project MOT to address wintertime conditions or periods of suspended Work.

- A switching procedure for each control stage change identified in the MOT plans. The switching procedure shall consist of the methods, actions, and signing necessary to complete the switch and the number and duties of traffic personnel assigned to perform the switch.
- The traffic control plans shall be complete including all necessary details. Only approved traffic control plans shall be used by the Design-Builder, typical plans are not acceptable unless incorporated into the approved plans.

The MOT plans and revisions to the plan shall be submitted to WSDOT for comment. The MOT plans and plan revisions shall be signed and sealed by the Design-Builder's Traffic Engineering Manager. WSDOT will respond to the MOT plan submittals within 10 business days.

### **Design Vehicle**

The MOT Plan shall accommodate the WB-67 design vehicle. Provisions for oversized vehicles shall be coordinated with WSDOT when detours or limited vertical clearance are included in the MOT plans.

### **Minimum Vertical Clearance**

A minimum vertical clearance of sixteen and half feet shall be maintained for I-5 and State highways. A minimum vertical clearance of fifteen and half feet shall be maintained for city streets.

### **Restricted Hours**

The Design-Builder shall not close any traffic lanes during events at the Everett Convention Center, Evergreen State Fair and other events with expected attendance over 10,000, from 2 hours before the event to 2 hours after the event.

The following tables list the allowable hours for I-5 mainline, on/off ramps, and the impacted city streets. These tables shall not be construed to supercede the maximum number of closures stipulated elsewhere in this Section 2.20. Any restrictions for roadway segments not listed in the table require WSDOT approval.

The Design-Builder agrees to pay liquidated damages in the amounts listed below for closures outside of the allowable hours. Liquidated damages will be assessed per 15 minutes. A fraction of a 15-minute period will be rounded up to the next whole 15 minutes.

**Table 2.20.4.1**

**Title: I-5 Northbound Allowable Closure Hours and Liquidated Damage Amounts**

I-5 NB South of MP-190		
<b>Weeknight</b>	<b>Saturday/Sunday</b>	<b>Notes</b>
10pm-5am	11pm-9am	Single Lane Closure
11pm-5am	Mid.- 7am	Two Lanes Closure
I-5 NB North of MP-190		

10pm-8am	10pm-10am	Single Lane Closure
Mid.-6am	Mid.-8am	Two Lanes Closure
\$2000 Per 15-minutes Per Lane		

**Table 2.20.4.2****Title: I-5 Southbound Allowable Closure Hours and Liquidated Damage Amounts**

I-5 SB South of MP-190		
Weeknight	Saturday/Sunday	Notes
8pm-5am	10pm-7am	Single Lane Closure
11pm-5am	Mid. - 7am	Two Lanes Closure
I-5 SB North of MP-190		
7pm-6am	10pm-10am	Single Lane Closure
11pm-5am	Mid.-9am	Two Lanes Closure
\$2000 Per 15-minutes Per Lane		

Rolling slowdowns for setting of girders or sign bridges must be approved by the Department on a case by case basis.

**Table 2.20.4.3****Title: I-5 On-Ramps Allowable Closure Hours and Liquidated Damage Amounts**

Weeknight	Saturday/Sunday	
<b>SR 99 SR 526 Collector to SB 5 On-Ramp</b>		
11pm-4am	11pm-7am	Merge lane Closure only
11pm-4am	11pm-7am	Add lane Closure only
\$250 Per 15-minutes per lane		
<b>EB SR 526 to NB 5 On Ramp</b>		
11pm-5am	11pm-7am	
\$500 Per 15-minutes		
<b>NB SR 527 to NB I-5 On-Ramp</b>		
11pm-6am	11pm-7am	
\$250 per 15 minutes		
<b>41st St to NB 5 On-Ramp</b>		
11pm-6am	11pm-7am	
\$150 Per 15-minutes		
<b>Broadway to SB 5 On-Ramp</b>		
11pm-5am	11pm-7am	Single Lane Closure Only
\$200 Per 15-minutes		
<b>Pacific Ave to SB 5 On-Ramp</b>		
11pm-5am	11pm-7am	
\$150 Per 15-minutes		
<b>Everett Ave to NB 5 On-Ramp</b>		
11pm-6am	11pm-7am	
\$200 Per 15-minutes		
<b>WB US 2 to SB I-5 On-Ramp</b>		
11pm-4am	11pm-7am	
\$400 Per 15-minutes		
<b>WB US 2 to NB I-5 On Ramp</b>		

11pm-6am	11pm - 7am	
\$250 per 15 minutes		
<b>Marine View Drive to SB 5 On-Ramp</b>		
11pm-5am	11pm-7am	
\$250 Per 15-minutes		

**Table 2.20. 4.4****Title: I-5 Off-Ramps Allowable Closure Hours and Liquidated Damage Amounts**

<b>Weeknight</b>	<b>Saturday/Sunday</b>	
<b>SB 5 to SR 527/SR 99/WB 526 Off-Ramp</b>		
11pm-4:00am	11pm-7am	
\$400 Per 15-minutes		
<b>NB 5 to SR 527/SR 99/WB 526 Off-Ramp</b>		
11pm-4am	11pm-7am	
\$750 Per 15-minutes		
<b>SB 5 to 41<sup>st</sup> St Off-Ramp</b>		
11pm-5am	11pm-7am	
\$350 Per 15-minutes		
<b>NB 5 to Pacific Ave Off-Ramp</b>		
11pm-6am	11pm-7am	
\$150 Per 15-minutes		
<b>SB 5 to EB US 2 movement</b>		
11pm-5am	11pm-7am	
\$200 Per 15-minutes for this movement		
<b>SB 5 to Everett Ave Off-Ramp</b>		
11pm-5am	11pm-7am	
\$200 Per 15-minutes for this movement		
<b>NB 5 to Broadway (left side exit)</b>		
8pm-7am	8pm-7am	Left lane only (Drop lane)
\$350 per 15 minutes		
8pm-7am	8pm-7am	Right lane only (Option lane)
\$350 per 15 minutes		
11pm - 7am	11pm – 7am	Right & Left lane (Full Closure)
\$750 per 15 minutes		
<b>NB 5 to Marine View Drive Off-Ramp</b>		
11pm-5am	11pm-7am	
\$400 Per 15-minutes		
<b>NB I-5 to EB US 2 Off Ramp</b>		
midnight-5am	midnight-5am	
\$400 per 15 minutes		

**Table 2.20.4.5****City of Everett Streets Allowable Nighttime Closure Hours****(Unless otherwise Approved by the City of Everett) and Liquidated Damage Amounts**

<b>Weekdays</b>	<b>Saturday/Sunday</b>	
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<b>Weekdays and Weekends</b>	<b>Liquidated Damage Amounts</b>	<b>Number of Closures Allowed</b>	
11:00pm-6:00am, unless otherwise approved by the City /	\$150 per 15 minutes per lane	4	<b>Lowell Road</b>
N/A	N/A	Provide continuous access to all residences and businesses	<b>Main Street</b>
N/A	N/A	Provide continuous access to all residences and businesses	<b>36<sup>th</sup> Street</b>
N/A	N/A	Provide continuous access to all residences and businesses	<b>Smith Ave.</b>
11:00pm-6:00am, unless otherwise approved by the City	\$150 per 15 minutes per lane	4	<b>Pacific Avenue</b>
11:00pm-6:00am, unless otherwise approved by the City	\$150 per 15 minutes per lane	4	<b>Hewitt Avenue</b>

### ***I-5 Mainline***

#### **General Requirements**

The following requirements apply only to temporary MOT and do not apply to permanent design.

Any existing shoulders that are used to carry short-term temporary traffic shall meet the requirements in Section 2.7.3.7.

Mainline general purpose and HOV lanes for MOT shall be a minimum of 11-feet wide.

Each shoulder shall be a minimum of 2-feet wide and shall be paved. For shoulders with barrier, the minimum distance from the edge of the driving lane to the face of barrier shall be 2 feet. A nominal 8-foot right shoulder/distress lane shall be provided when feasible.

A minimum 2-foot sliding distance shall be provided behind temporary concrete barrier unless the barrier is adequately anchored. Temporary concrete barrier placed along the edge of a bridge structure shall be anchored.

Opposing traffic lanes of mainline I-5 shall be separated by temporary concrete barrier (TCB) in accordance with WSDOT design requirements. 18 inch glare screen shall be placed on top of the TCB when opposing lanes are separated by less than 12 feet.

Lane markings for temporary lane markings shall be raised pavement markers.

Temporary impact attenuators shall be one of the following:

- Quad-guard
- REACT 350
- Inertial Barriers
- SCI100GM
- Absorb 350
- TRACC
- TRITON CET

### **Design Criteria**

The minimum design speed for MOT shall be 60 mph.

### **Work Zone Speed Limit**

For using law enforcement on State controlled roadways, Appendix T1 – **Guidelines for Using WSP Traffic Control Assistance**, lists when and what is acceptable use of state patrol. The Design-Builder shall use WSP for rolling slow down operations, one trooper per every two lanes. The Design-Builder shall contact local agencies for law enforcement use on roadways not controlled by the State. Design-Builder shall be fully responsible for all costs, agreements, and or permits needed for use of Law enforcement.

### **Law Enforcement**

For using law enforcement on State controlled roadways, Appendix T1 – **Guidelines for Using WSP Traffic Control Assistance**, lists when and what is acceptable use of state patrol. The Design-Builder shall use WSP for rolling slow down operations, one trooper per every two lanes. The Design-Builder shall contact local agencies for law enforcement use on roadways not controlled by the State. Design-Builder shall be fully responsible for all costs, agreements, and or permits needed for use of Law enforcement.

### **Sequential Arrow Displays**

Each vehicle used to place, maintain, or remove components of a traffic control system on multilane highways shall be equipped with a sequential arrow display that shall be in operation when the vehicle is being used for placing, maintaining, or removing the components. Vehicles equipped with sequential arrow displays not involved in placing, maintaining, or removing the components when operated within a stationary type lane closure shall display only the caution mode. The sign shall be controllable by the operator of the vehicle while the vehicle is in motion. Sequential arrow displays used in moving lane

closures shall be truck-mounted. This requirement applies to all vehicles placing, maintaining, and removing traffic control devices, including concrete barrier trailers and “cherry pickers.”

### ***I-5 Ramps***

#### **General Requirements**

No ramp closures shall be permitted from November 15 to January 02.

Each ramp will be designed to accommodate WB67 design vehicle, each lane shall be a minimum of 12 feet wide on entrance and exit Ramps. Minimum 2-foot wide paved shoulders shall be provided on both sides of each Ramp.

Each shoulder shall be a minimum of 2-feet wide and shall be paved. For shoulders with barrier, the minimum distance from the edge of the driving lane to the face of barrier shall be 2 feet. A nominal 8-foot right shoulder/distress lane shall be provided when feasible.

A minimum 2-foot sliding distance shall be provided behind temporary concrete barrier unless the barrier is adequately anchored. Temporary concrete barrier placed along the edge of a bridge structure shall be anchored.

#### **Design Criteria**

The minimum design speed for MOT on the entrance and exit Ramps shall be 35 mph, except for loop Ramps, where the design speed may be reduced to 25 mph. Exit speeds shall be posted for all ramps. For ramps where the MOT design speed is reduced, black on orange construction signs shall be used for the exit speed signs.

#### **Entrance and Exit Ramps Closures**

Consecutive off-ramps or on-ramps may not be closed concurrently.

At least 12 business days in advance of a Ramp closure, the Design-Builder shall furnish to WSDOT a written Ramp closure schedule. The schedule shall show the locations and times of all Ramp closures and the closure time limits specified in the Contract Documents. The Design-Builder will be notified of any closure comments or any closure that will require coordination with other parties as a condition of the closure.

The Design-Builder shall confirm all scheduled closures with WSDOT at least five (5) business days prior to the date on which the Ramp closure is to be made. All Ramp closures not confirmed as scheduled shall be cancelled. Confirmed Ramp closures that are cancelled for unsuitable weather may be rescheduled for the next Day.

Ramp closures will be allowed during nighttime or weekend hours during the allowed hours of closure. These nighttime closures are meant to be short-term in nature and should not be considered a long-term approach to the Ramp construction by the Design-Builder.

The Design-Builder shall furnish and install black and white information signs that provide advance notification of a ramp closure a minimum of 5-business days prior to closure. In addition, each Ramp closure on I-5 shall have a supplemental CMS that display the date and time of the closure a minimum of 48 hours in advance of the closure.

## Detours

All detours must be in place including all signing prior to the ramp closure. Ramp detours using local roads shall follow traffic control permit requirements of each municipality impacted.

## Allowable Weekend Ramp Closures

The following weekend ramp closures will be allowed without assessment of liquidated damages inside the hours listed below. Liquidated damages will be assessed to hours outside the list below as stipulated in Table 2.20.4.3 and Table 2.20.4.4.

If additional ramp closures are required in addition to the Allowable Ramp Closures in Table 2.20.4.6 and Table 2.20.4.7, Liquidated damages will be assessed in accordance with rates shown in Table 2.20.4.3 and Table 2.20.4.4.

**Table 2.20.4.6**

### Allowable Weekend On-Ramp Closures

Starting	Ending	Number of Closures Allowed	
		No Weekend Closures Allowed	<b>SR 99/WB SR 526 Collector to SB 5 On-Ramp</b>
		No Weekend Closures Allowed	<b>EB SR 526 to NB 5 On Ramp</b>
		No Weekend Closures Allowed	<b>NB SR 527 to NB I-5 On-Ramp</b>
11pm Friday	4 am the following Monday	4	<b>41st St to NB 5 On-Ramp</b>
		No Weekend Closures Allowed	<b>BroadWay to SB 5 On-Ramp</b>
11pm Friday	4 am the following Monday	2	<b>Pacific Ave to SB 5 On-Ramp</b>
11pm Friday	4 am the following Monday	2	<b>Everett Ave to NB 5 On-Ramp</b>
11pm Friday	4 am the following Monday	2	<b>WB US 2 to SB I-5 On-Ramp</b>
11pm Friday	4 am the following Monday	2	<b>WB US 2 to NB I-5 On Ramp</b>
11pm Friday	5 am the following Monday	5	<b>Marine View Drive to SB 5 On-Ramp</b>

**Table 2.20. 4.7**

### Allowable Weekend Off-Ramp Closures

Starting	Ending	Number of Closures Allowed	
11pm Friday	4 am the following Monday	2	<b>SB 5 to SR 527/SR 99/WB 526 Off-Ramp</b>
11pm-Friday	5 am the following Monday	1	<b>NB 5 to SR 527/SR 99/WB 526 Off-Ramp</b>
11pm-Friday	6 am the following Monday	2	<b>SB 5 to 41st Ave SE Off-Ramp</b>

11pm-Friday	6 am the following Monday	2	<b>NB 5 to Pacific Ave Off-Ramp</b>
11pm-Friday	5 am the following Monday	2	<b>SB 5 to EB US 2 movement</b>
11pm-Friday	5 am the following Monday	2	<b>SB 5 to Everett Ave Off-Ramp</b>
11pm-Friday	5 am the following Monday	4	<b>NB 5 to Broadway (left side exit)</b>
11pm-Friday	5 am the following Monday	2	<b>NB 5 to Marine View Drive Off-Ramp</b>
11pm-Friday	5 am the following Monday	4	<b>NB I-5 to EB US 2 Off Ramp</b>

## ***Local Roads***

### **General Requirements**

All traffic control plans affecting local roads including but not limited to mainline I-5 closures, entrance and exit ramp closures and closure of other local roads shall follow traffic control permit requirements of each municipality impacted. The Design-Builder shall be responsible for obtaining required permits. The Design-Builder shall coordinate with the City of Everett regarding concurrent construction Work along city cross streets that may be affected by traffic control for this Project.

The existing number of through lanes must be maintained on all local roads during the restricted hours. Turn lanes shall be a minimum of 12 feet wide, through lanes shall be a minimum of 11 feet wide and all curb lanes shall be a minimum of 12 feet wide.

A minimum 2-foot shy distance and 2-foot for sliding distance behind the barrier shall be provided for any temporary or permanent barrier device. Impact attenuators shall be used to protect the ends of barrier within the clear zone.

### **Design Criteria**

The design speed of all local roads shall be at the existing posted speed limit unless otherwise approved by the City of Everett.

### **Detours**

All detours must be in place including all signing prior to closure of a road. Detours using local roads shall follow traffic control permit requirements of each municipality impacted.

The Design-Builder shall identify all bus routes that may be affected by the detour and coordinate with the bus agency regarding impacts to schedule and location of bus stops.

### **Allowable Local Road Closures**

The Design-Builder shall provide written notice to WSDOT and impacted local agency a minimum of 14 calendar days prior to closing, restricting, or detouring traffic. The Design-Builder shall be responsible for complying with all requirements contained within roadway closure permits. A Traffic Control Plan shall be submitted for review and approval of the City Engineer. When any Road is closed to traffic, a detour shall be provided. A Detour

Plan shall be submitted and approved by the City Engineer prior to any street closures. The review and approval is estimated to take 7 calendar days.

### **Notice of Closures**

Each roadway closure on city streets shall have a supplemental PCMS as part of the traffic control layout. The PCMS shall display the date and time of the closure a minimum of 72 hours in advance of the closure. All roadway closures must provide access for local residents and business access. The Design-Builder shall individually notify residents and businesses directly affected by any closures a minimum of 5-business days in advance.

The Design-Builder shall individually obtain the required permits for working on and/or closing the City of Everett roadways, the Design-Builder shall furnish and install black and white information signs that provide advance notification of the roadway closure a minimum of 5-business days prior to closure or in accordance with the City of Everett permits.

The following weekend local street closures will be allowed without assessment of liquidated damages inside the hours listed below. Liquidated damages will be assessed to hours outside the list below as stipulated in Table 2.20.4.5

If additional weekend local street closures are required in addition to the Allowable Local Street Weekend Closures in Table 2.20.4.8. Liquidated damages will be assessed in accordance with rates shown in Table 2.20.4.5

**Table 2.20.4.8**  
**City of Everett Streets Allowable Weekend Closure**  
**Unless otherwise Approved by the City of Everett**

<b>Starting</b>	<b>Ending</b>	<b>Number of Closures Allowed</b>	<b>Local Street</b>
11pm-Friday	6 am the following Monday	2	<b>Lowell Road</b>
N/A	N/A	Provide continuous access to all residences and businesses	<b>Main Street</b>
11pm-Friday	6 am the following Monday	2	<b>36<sup>th</sup> Street</b>
11pm-Friday	6 am the following Monday	4	<b>Smith Ave.</b>
11pm-Friday	6 am the following Monday	2	<b>Pacific Avenue</b>
11pm-Friday	6 am the following Monday	2	<b>Hewitt Avenue</b>

### ***Pedestrian Access***

The Design-Builder shall maintain pedestrian access on all sidewalks and intersections along city streets insofar as it is possible. Pedestrian sidewalks and paths that are currently ADA accessible shall be maintained conforming to ADA requirements. If it is necessary to close sidewalks, detour routes shall be provided with consideration for ADA accessibility. For arterial roads at least one side of the street shall provide pedestrian access at all times with the exception of periods of full roadway closure or with prior approval from WSDOT and the local agency. If Work will be performed over the pedestrian route, temporary lighted covered walkways shall be provided to protect pedestrians from overhead hazards. Refer to the *Pedestrian Facilities Guidebook*, Toolkit.

### **MOT Push Vehicles**

The Design-Builder shall provide a minimum of 6 vehicles equipped with safety push bars and emergency warning lights and be capable of pushing disabled vehicles to emergency pull-outs within 15 minutes response time. The push vehicle patrol must meet the following minimum requirements:

Patrol should be available Monday through Friday 6:00 am to 7:00 pm and when weekend closures of ramps occur.

Maintain communication with the TSMC for traveler information and dispatching via 800 mHz radio and Nextel phone.

### **Temporary Emergency Pullouts**

Pullouts shall be located on the right side of the travel lanes.

### **Temporary Emergency Vehicle Access**

The Design-Builder shall provide coordination with local and regional emergency service providers, law enforcement entities, and other related corridor users including timely communication of lane closure plans, detour plans, and other Project elements that may affect the appropriate delivery of time-sensitive services. Emergency vehicle access shall be maintained through all nighttime, weekend and evening closures when feasible.

### **Maintain Camera Surveillance**

The freeway management system cameras are used to detect and verify incidents in the construction Work zone. The existing cameras shall remain operational or temporary cameras installed as follows:

When two or more consecutive, in-place cameras are to be off line due to construction for greater than 21 Days, the Design-Builder shall install a temporary camera. The temporary camera shall be installed and operational within 7 days of the removal of the existing in-place camera. The temporary cameras, if utilized, must be compatible with the existing system, must be installed at approximately the same height as the existing cameras, and must be aligned to produce a similar view as the cameras it replaces.

### **Variable Message Signs (VMS)**

There are no existing overhead variable message signs (VMS) within the Project limits. Existing VMS signs approaching the Project should be utilized to provide motorists with incident and construction related information prior to entering the Work zone. The Design-Builder shall coordinate with the TSMC to provide timely, accurate information regarding planned closures and updated traffic and construction information.

### **Design-Builder Response Time**

At all times the Design-Builder shall have at least one employee on call equipped with a mobile phone who can respond to and take appropriate action to manage an incident within 30 minutes. Upon arrival that employee shall have the experience, resources and equipment required to repair barrier or set up temporary traffic control until the barrier can be repaired.

## **2.20.4.2 Construction Requirements**

### ***Signing, Pavement Markings and Traffic Control Devices During Construction***

The Design-Builder shall inspect all signing (existing and temporary) daily, noting damaged signs, misplaced signs and graffiti affecting legibility of the sign. Every detour route shall be driven daily; including at least twice each week at night, to ensure all detour signing is in place. Signing for detours shall be covered or removed when detours are not in use. The Design-Builder shall provide a schedule for repairing, cleaning or replacing signs; procedures shall address rectifying incorrect or misleading signing that may present a hazard to road users.

The Design-Builder shall inspect all pavement markings daily. The Design-Builder shall provide a schedule for replacing damaged pavement markings and establish minimum replacement timeframes based on the degree of degradation. If missing or damaged pavement markings present a hazardous condition, WSDOT may require the Design-Builder to close lanes or replace the pavement marking within 24 hours.

The Design-Builder shall maintain, clean and/or replace all pavement markings when they become damaged or lose reflectivity.

The Design-Builder shall use equipment that is not detrimental to the roadway surface for removing pavement markings, as approved by WSDOT.

### ***Temporary Signalization***

This section applies to new temporary signals necessary for detour routes or other construction phasing. Any modifications to existing traffic signals must be shown in the MOT plans and approved by the operating agency. Modifications proposed for signal timing or phasing must be coordinated with and Approved by the operating agency.

### ***Electrical Service***

The Design-Builder shall coordinate with the local power supplier to provide the electrical service connection for each temporary signal system. The Design-Builder shall pay the connection fees. The WSDOT will pay monthly electrical power costs of the temporary signal system.

***Material Requirements***

The Design-Builder shall furnish and install all required materials for the temporary signalization.

The Design-Builder shall provide vehicle detection methods to optimize all temporary signal system installations. The Design-Builder may use inductive loops or video image detection for temporary signal installations.

***WSDOT Inspection***

The Design-Builder shall provide 24 -hour notices to WSDOT prior to implementing temporary signal phasing.

***Signals Operation and Maintenance***

The Design-Builder shall provide and maintain all components of the temporary and permanent signal systems. The signal system shall conform to WSDOT Design Manual Guidelines and conform to the Manual on Uniform Traffic Control Devices. Access to the pedestrian push button shall be provided throughout the Project. The vehicle detection system shall be operational at all times, either through induction loops or temporary video detection. The Design-Builder shall remove all temporary signal system installations upon completion and turn-on of the new permanent signal systems. The Design-Builder shall maintain all components of the temporary and permanent signal systems from the first day of construction until Final Acceptance.

***Temporary Lighting***

Temporary lighting shall be used when existing lighting must be removed or disconnected and new lighting is not in operation and for areas where traffic has been shifted and additional lighting is necessary for the safety of the traveling public or workers. Temporary lighting shall be provided for all on-ramps and off-ramps and at intersections where traffic control devices are in place.

The Design-Builder shall:

1. Design temporary lighting plans.
2. Maintain current levels of roadway illumination for all roadway segments and interchanges that are currently lit.
3. Provide all materials and equipment for temporary lighting installations.
4. In the clear zone, provide only lighting units that are breakaway or protected from crash potential.
5. Provide maintenance for the temporary lighting system. Maximum repair times shall be established by and adhered to by the Design-Builder for individual luminaries and segment

***Timber Light Standards***

Timber light standards may be used for temporary lighting where breakaway or slip bases are not required. Timber light standards must be outside of the clear zone or protected by barrier.

### **Power Service Cable**

The Design-Builder shall coordinate with the local power supplier to provide the power service connection. The Design-Builder shall pay all costs charged by the electric power companies for providing power connections. The WSDOT shall pay the monthly electric bills for existing, temporary and new lighting installed under the Contract until Final Acceptance of the Project.

WSDOT or others will pay all monthly electrical bills for lighting after Final Acceptance of the Project.

### ***Video Record***

A drive-through video of all MOT devices shall be made each week, and immediately after each accident causing injuries, and after each shift in MOT setup. The tapes shall be maintained in a remote fireproof location, and a log of the tapes with dates and times shall be provided to WSDOT on a monthly basis. WSDOT shall have the right to review the tapes at any time with 24 hours notice to the Design-Builder.

## **2.21 RELATIONS WITH RAILROAD**

### **2.21.1 General**

Railroad facilities belonging to The Burlington Northern Santa Fe Railway Company (BNSF) have been identified in the Project corridor as depicted in RFP Appendix Q (Railroad Exhibits) and Appendix R2 (Color-Coded Acquisition Plans). The Railway Company or Railroad Company, as used in the following specifications, shall be the Burlington Northern Santa Fe Railway Company, or other railway company or companies specified in the RFP.

This Section provides information relating to the requirements applicable to the Work performed upon or adjacent to the Railroad Right of Way. The Design-Builder shall abide by and fulfill the requirements related to Railroads as outlined in this Section and applicable standards.

The Railroad Company has indicated its willingness to accommodate WSDOT with the construction of this Project; however, the Railroad Company will dictate its own schedule for railroad-related Work. The Railroad Company will provide working windows for demolition and construction.

The Railroad Company operates up to 80 trains per day on the tracks in the Project vicinity at speeds up to 40 m.p.h.; this should be verified with the Railway Company by the Design-Builder, as rail traffic service levels are subject to change by the Railway Company at any time.

The Railroad Company has notified the Department that no interference or delays with railroad operations will be allowed from October 1 to December 31 in any given year. This could possibly be as restrictive as completely denying the Design-Builder access to railroad property during that time frame. This should be verified by the Design-Builder, as the Railroad Company may change this restriction to be more or less restrictive. The railroad company has alerted WSDOT that the tracks under bridge 5/633 E & 5/633 W are used for parking of non –scheduled trains, which can occur for days at a time. The Design Builder shall be responsible for coordinating work within the railroad right of way.

The Design-Builder shall make a good faith effort to accommodate the City of Everett Master Plan with regard to the proposed City of Everett/BNSF land exchange in its design, as depicted in RFP Appendix Q on “2001 City of Everett Aerial Orthophoto, and indicated in the electronic Project files.

Contacts:

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Appendix R1 - Proposed Right of Way Modifications, is provided to show the proposed modifications to the existing approved ROW plans provided in Appendix R – Right of Way Data. Appendix R2 – Color Coded Acquisition Plans, was developed and included in this RFP to clarify WSDOT’s proposed acquisitions.

## **2.21.2 Mandatory Standards and Reference Documents**

### **2.21.2.1 Mandatory Standards**

**General** – Design-Builder shall perform all Railroad Vicinity Work in accordance with the requirements of the Mandatory Standards listed in Table 2.21.1, or as approved by the Railroad Company, whichever standard is greater. The documents in Table 2.21.1 are listed in order of priority.

**Conflicts and Priority** – If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builders Proposal.

**Ambiguity** – If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Railroad before proceeding with design or construction.

**Version and Date** – Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Railroad Permits and Agreements** – The WSDOT is in the process of acquiring an Operation & Maintenance Agreement for this project between the Department and BNSF. This agreement will identify the areas where the Department has easement rights on BNSF property, describes conditions for long-term WSDOT maintenance, and requires the Design-Builder to obtain a “Construction and Maintenance Agreement” and a “Right of Entry Agreement” before entering on BNSF property. Note that the date indicated in Table 2.22.3 for BNSF property in the column labeled “Possession and Use” represents the date by which WSDOT will have executed the “Operation and Maintenance Agreement”. An example agreement from another project is provided in Appendix Q1.

The Design Builder shall obtain a Construction and Maintenance Agreement and a Right of Entry Agreement from the Railroad. An example of a Construction and Maintenance Agreement between a Design-Builder and the Railroad is in appendix Q2 and Right-of-Entry is in appendix Q3. The Design-Builder will be responsible for any additional permits, insurance, and or agreement required by the railroad. For any required permits or agreements needed, the Design-Builder shall contact the Railroad Company or its designated Property Manager. As of 2004, the Staubach Company is BNSF’s designated Property Manager. Permits may be arranged by contacting Julie Alexander at the Staubach Company at 817-230-2631 (fax: 817-306-8265). Agreements may be arranged by contacting BNSF’s Manager of Public Projects as identified in Section 2.21.1. . The Design Builder will be solely responsible for any cost associated with obtaining and meeting the requirements of the Construction and Maintenance Agreement, the Right of Entry Agreement, and any other permits, and or agreements required to perform work on Railroad property.

**Table 2.21-1**  
**Mandatory Standards for Railroad Work**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1	Design-Builder	Proposal for I-5 Everett HOV Design-Build Project	n/a	**	Proposal
2	BNSF	Utility Accommodation Policy ****	n/a	April 16, 2004	n/a
3	BNSF	Design Guidelines for Industrial Track Projects ****	n/a	March 2004	Industrial Track Standards
4	American Railway Engineering and Maintenance-of-Way Association	Manual for Railway Engineering *****	n/a	2004	AREMA Manual
<p>** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.</p> <p>**** These documents are available from the BNSF web site (<a href="http://www.bnsf.com">www.bnsf.com</a>)</p> <p>***** The Design-Builder is responsible for obtaining this document.</p>					

### 2.21.3 Design and Construction Criteria

All Work over, below, or adjacent to any Railroad Company Right of Way shall be performed in conformance with the provisions of the Mandatory Standards as listed in Table 2.21.1, the “Operation and Maintenance Agreement” for this Project between WSDOT and BNSF, the “Construction and Maintenance Agreement” for this Project between the Design-Builder and BNSF, and the “Right of Entry Agreement” for this Project between the Design-Builder and BNSF or as otherwise required by the Railroad Company.

The Design-Builder shall be required to make its own arrangements with the Railroad Company for coordinating its operations and those of the Railroad Company. No additional compensation will be made to the Design-Builder for any costs incurred by him, or because of any delays to his forces or equipment, which may be caused by the operations of the Railroad Company.

Existing vertical clearances at 36th St. Overcrossing (Bridge 5/633 E&W) are depicted in RFP Appendix Q.

Exhibit of conceptual aqueduct design crossing BNSF right of way at Main St. is provided in RFP Appendix Q.

Bridge structure for the aqueduct bridge shall meet a minimum horizontal clearance and a minimum vertical clearance (top of rail to bottom of structure) as shown in Appendix M5, sheet BR47.

## **2.21.4 Submittals**

### **2.21.4.1 General**

If the Design-Builder will have equipment, materials, or personnel within the Railroad Company's Right of Way, Liability Insurance will be required by the Railroad Company. The Design-Builder shall submit to the Department an approved "Construction and Maintenance Agreement" for this Project between the Design-Builder and BNSF, and the "Right of Entry Agreement" for this Project between the Design-Builder and BNSF prior to entering or conducting activities within the Railroad Company's Right of Way.

### **2.21.4.2 Railroad Protective Liability Insurance**

The Design-Builder shall protect the Railroad Company and any other railroad company occupying or using the Railroad Company's rights of way or lines of railroad against all loss and damages arising from activities of the Design-Builder or the Design-Builder's forces or any of the Design-Builder's subcontractors or agents.

The Design-Builder shall furnish for the Railroad Company copies of a Railroad Protective Liability Insurance Policy providing for the protection to the Railroad Company in the manner and form as required by the Railroad Company. The Design-Builder shall furnish the Department a copy of the Railroad Company-approved Railroad Protective Liability Insurance Policy.

When all the Work involving construction activities within or immediately adjacent to the railroad right of way is completed the Design-Builder may make a written request to the Department to be relieved of the responsibility to continue all or part of the insurance specified above. If the Department deems the portion of the Work in that area is complete the Department may approve the Design-Builder's request. However, if for any reason the Design-Builder resumes or starts any new Work in that area, including being ordered to do so by the Department or for any reason, the insurance shall be reinstated by the Design-Builder before the Work is started. If the insurance must be reinstated because of negligence or acts by the Design-Builder or failure of the Design-Builder to perform all the Contract requirements, the costs shall be the responsibility of the Design-Builder. If the insurance must be reinstated because of changes to the Contract, the costs will be considered in accordance with Section 2.9 as stated herein.

## **2.22 RIGHT OF WAY**

### **2.22.1 General**

The Design-Builder shall verify Right-of-Way boundaries prior to utilization of Right-of-Way areas outside of existing fence line. Survey control has been established and is identified in the ROW and Monumentation Plans. All operations of the Design-Builder, upon the portions of the Site made available to the Design-Builder from time to time (including storage of equipment and materials), shall be confined to portions of the ROW authorized or approved by the Federal Highway Administration (FHWA) through the certification process.

All acquisitions shall be performed in accordance with all Applicable Laws, including the Uniform Relocation Assistance and Real Property Acquisition Policies Act of 1970, as amended, as well as the Uniform Relocation Assistance and Real Property Acquisition, Washington Administrative Code (WAC) WAC 468-100 and 49 CFR Part 24.

WSDOT shall be responsible for the acquisition of all ROW identified on the ROW Plans. WSDOT shall provide the Design-Builder copies of construction commitments (in the form of a Construction Memorandum) and, if requested any documentation of WSDOT ownership.

The utility relocation process is set forth in Section 2.10 and the railroad process is found in Section 2.21.

Appendix R1 - Proposed Right of Way Modifications, is provided to show the proposed modifications to the existing approved ROW plans provided in Appendix R – Right of Way Data. Appendix R2 – Color Coded Acquisition Plans, was developed and included in this RFP to clarify WSDOT’s proposed acquisitions.

## 2.22.2 Mandatory Standards and Reference Documents

### 2.22.2.1 Mandatory Standards

**General.** Design-Builder shall conduct all ROW activities in accordance with the requirements of the Mandatory Standards listed in Table 2.22.1 and in accordance with Section 2.22.2.2, Reference Documents. Questions regarding the applicability of Mandatory Standards and Reference Documents will be referred to WSDOT.

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder’s Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder’s Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the WSDOT before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.22.1**

Mandatory Standards for Right-of-Way Acquisition

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for Everett-HOV Design-Build Project</i>			
	Code of Federal	23 CFR Chapter 1 part 712			

	Regulations	subpart B, General Provisions and Project Procedures			
	FHWA	23 CFR Part 710.313 (Design-Build Projects)			
	FHWA	49 CFR Part 24 Uniform Relocation Assistance and Real Property Acquisition Act of 1970, as amended			
	Revised Code of Washington (RCW)	Relocation Assistance - Real Property Acquisition Policy	RCW 8.26		
	Washington Administrative Code (WAC)	Uniform Relocation Assistance and Real Property Acquisition	WAC 468-100		
** Only to the extent that it exceeds another listed standard.					

### 2.22.2.2 Reference Documents

Design-Builder shall use the Reference Documents listed in Table 2.22.2 as supplementary guidelines for Right of Way. These Documents are listed in alphabetical order by the author or issuing agency and then by title, as they have no established order of precedence.

**Table 2.22.2**  
**Reference Documents for Right-of-Way Acquisition**

Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
WSDOT	Agreements Manual	M 22-99		
WSDOT	Right of Way Manual	M 26-01		
WSDOT	Design-Build Design Manual	MS 22-02	2004	RFP Appendix Z
WSDOT	Plans Preparation Manual	M 22-31	2004	
WSDOT	Utilities Manual	M 22-87	1998	

### 2.22.3 Performance Requirements

Use the publications listed in Table 2.22.2 as mandatory requirements for the practices, procedures, and methods to be used in the appraisal and acquisition of ROW. Listed publications have no established order of precedence.

Design-Builder is required to meet with the WSDOT to assure compliance with required standards.

The Design-Builder will be responsible for certifying, at each new construction phase, that all property rights necessary to construct, operate, and maintain the highway facility have been acquired in accordance with Applicable Laws and regulations cited in Section 2.22.2.2 prior to the commencement of construction by Design-Builder.

## **2.22.4 Right-of-Way Acquisition**

### **2.22.4.1 Right-of-Way Requirements Determination**

If additional Right-of-Way is requested by the Design-Builder, WSDOT will review the request, provided that it is prepared in accordance with General Provisions Section 1-04.4 and Section 2.22.2.2. All costs and delays for acquiring the additional ROW will be borne by the Design-Builder. Design-Builder shall determine the requirements for new Right-of-Way rights.

Design-Builder shall submit the preliminary Right-of-Way needs to the WSDOT Engineer, in writing. The submittal shall include the following:

- A letter indicating the Project name, Contract number, Project location, originator of report (Firm's Name), submittal date and submittal type.
- A plan of sufficient scale and detail to show the existing and proposed roadway Right-of-Way and proposed easements prepared according to WSDOT Plans Preparation Manual M 22-31.
- ROW needs include, but are not limited to, additional land ownership, airspace corridors, access rights, and permanent or temporary easements.
- A discussion on the impacts to the Contract Schedule and the proposed plan to recover and such schedule impact.

Upon WSDOT approval to acquire additional ROW, WSDOT will provide staff or consultants to perform the Work. In order to minimize the impacts of acquisition on the property owners and expeditiously acquire the necessary property, all additional ROW, whether permanent or temporary, from an ownership shall be acquired in a single offer. The Design-Builder may acquire permits where no permanent rights are needed, in accordance with all applicable laws (See Section 2.22.2.2).

WSDOT will provide a funding estimate to the Design-Builder who will furnish sufficient funds to perform the Work. A ROW Work order will be established by WSDOT with those funds. Any settlements exceeding the funding estimate will require the approval of the Design-Builder.

Design-Builder may acquire any rights or interests in real property that, in the discretion of the Design-Builder is deemed necessary or advisable to acquire, for workspace, Design-Builder lay-down areas, material storage areas, or other convenience. WSDOT will not be obligated to exercise its power of eminent domain, will not come into title to the property, nor will it have any responsibility for the acquisition, maintenance, or disposition of additional properties or of any temporary right or interest therein.

**Table 2.22.3**  
**WSDOT Responsibility - Right-of-Way/Easement Acquisition**

WSDOT		Owner	Land Acquisition	Drainage Easement	Crossing Easement	Air Space Corridor	Possession & Use
Site	Parcel #						
WQF-1	1-21972	Hammer, David Lee	975				01-Dec-05
WQF-1	1-21974	BNSF*			3,056		30-Sep-05
WQF-1	1-21642	City of Everett	570,584	3,779	1,914		30-Sep-05
Br. 5/631E/W	1-22024	Tisdell, Donald E.	12,552			14,469	31-Jul-05
Br. 5/633E/W	1-21977	Smith St. Properties #1, LLC	873				30-Jun-05
Br. 5/633E/W	1-21980	Washington Trucking, Inc.	1,489				31-Jul-05
Br. 5/633E/W	1-21979	BNSF *		1,000			31-Jul-05
WQF-2	1-21644	City of Everett	63,695				01-Dec-05
WQF-2	1-22125	City of Everett				12,401	01-Dec-05
Br. 5/633E/W	1-21643	Port of Everett				252	30-Jun-05
WQF-2	1-22020	Eclipse Properties/City of Everett		24,301			30-Sep-05

\* Note: Dates indicated for BNSF are the dates by which WSDOT will provide an executed "Operation and Maintenance Agreement". Design-Builder will not be entitled to right of entry onto BNSF property until after WSDOT has executed the "Operation and Maintenance Agreement" and the Design-Builder has executed the "Construction and Maintenance Agreement" and "Right of Entry Agreement" with BNSF. See Technical Specifications Section 2.21.

#### 2.22.4.2 Risk of Loss, Obligation to Maintain and Repair

Design-Builder shall be responsible for the maintenance of improvements and for providing reasonable safety and security measures relative to the preservation of the acquired ROW parcels. The Design-Builder shall establish a Property Management Plan and shall submit such plan to WSDOT prior to Notice to Proceed. The Property Management Plan is subject to WSDOT's approval. The plan must assure that all acquired ROW is maintained in a manner, which will prevent, minimize, or correct problems such as vandalism, trespassing, rodent infestation, illegal dumping or disposal of rubble, and other debris on any ROW.

#### 2.22.4.3 Demolition

Design-Builder shall demolish all buildings, structures, and other improvements located on the ROW. The Design-Builder shall conduct any asbestos inspections, lead-based paint inspections and any other required action in accordance with applicable State regulations. All Utilities installed on or connected to the ROW shall be abandoned or removed in accordance

with the requirements of the applicable Utility Owner as a part of the demolition, unless otherwise noted.

#### **2.22.4.4 Restoration of Property and Landscape**

Design-Builder shall restore, at its own cost, property and landscaping that is damaged in the course of construction to a condition similar or equal to that existing prior to the damage occurrence by repairing, replacing in kind, rebuilding, replanting, restoring the property, or compensating the property owner.

#### **2.22.4.5 Temporary Fencing**

Design-Builder shall be required to furnish and install temporary chain link security fencing in order to contain animals, people etc., prior to removal of any existing sound barrier or ROW fencing in place within the Project limits.

### **2.23 SECTION NOT USED**

### **2.24 SECTION NOT USED**

## **2.25 CONTROL OF MATERIAL**

### **2.25.1 General**

The quality of materials and methods of construction and testing are essential to achieving an end product that provides the maximum benefit to the public. The Design-Builder's approach to materials sampling, testing and approval is essential in achieving an acceptable end product. The Design-Builder's process is required to meet FHWA and WSDOT requirements for sampling, testing and approval of materials used in this Project. The Design-Builder shall be responsible for the quality of construction and materials incorporated in the Project. The Design-Builder's Quality Assurance measures are to insure that operational techniques and activities provide material of acceptable quality.

#### **2.25.1.1 Materials Approval**

Prior to use, the Design-Builder shall notify the WSDOT Engineer of all proposed materials. The Design-Builder shall use the Qualified Product List or the Request for Approval of Material form.

All equipment, materials, and articles incorporated into the permanent Work:

1. Shall be new, unless the special provisions permit otherwise;
2. Shall meet the requirements of the Contract and be approved by WSDOT if required by the Contract;
3. May be inspected or tested at any time during their preparation and use; and

4. Shall not be used in the Work if they become unfit after being previously approved.

The Design-Builder will be responsible for all materials approvals and acceptance by means of testing, inspection, and documentation. A Materials Certification package as defined in the Construction Manual Chapter 9-01, approved by the Design-Builder's Construction QA Manager, shall be submitted to WSDOT prior to acceptance of the Project.

All materials shall be reviewed and approved by the Construction QA Manager prior to use. The Design-Builder may use the Qualified Product List (QPL), may submit a Request for Approval of Materials (RAM), to the Construction QA Manager for approval, or may denote approval by listing the material in the plans and specification as stamped by the Designer of Record.

**Qualified Products List (QPL)** – The Design-Builder may use products listed on the latest edition of WSDOT's Qualified Product List (QPL). The Construction Design-Builder shall submit the QPL page to the Construction QA Manager for approval. The Construction QA Manager shall ensure that the acceptance requirements as listed in the QPL for the product/material used is being followed.

**Request for Approval of Material (RAM)** - The RAM shall be used when the Design-Builder elects not to use the QPL or the material is not listed in the QPL or not shown in the Design Documents. The RAM shall be prepared by the Design-Builder and submitted to the Engineer of Record or Construction QA Manager for approval before the material is incorporated into the Work. Approval of the material does not constitute acceptance of the material for incorporation into the Work. The Construction QA Manager shall ensure that the acceptance requirements as listed in the WSDOT Standard Specifications; Section 9.4 of the Construction Manual, or the Contract special provisions for the product/material used has been followed.

**Aggregate Source Approval** – The Design-Builder can use any approved aggregate that is included in the WSDOT Aggregate Source Approval System for the approved purpose. If the Design-Builder wishes to use an aggregate source that is not on the WSDOT Aggregate Source Approval System, preliminary samples will have to be evaluated for the quality tests including degradation and LA Abrasion in addition to the acceptance testing. WSDOT will sample and test the materials from the unapproved source.

**Materials Acceptance** – All material that the Design-Builder wishes to use shall be tested, field verified, and or documented. All materials must be approved prior to use. The materials acceptance program shall be as defined in the WSDOT Construction Manual, WSDOT Materials Manuals, WSDOT Standard Specifications, or other provisions of the Contract Documents.

**Visual Inspection** – The acceptance of certain types of materials may be based on visual inspection prior to incorporating the materials into the Project. Product documentation shall be provided in the form of a manufacturer's catalog cut or product data sheets. For details regarding specific instructions for field acceptance see Chapter 9-04 of the WSDOT Construction Manual.

**Certificate of Compliance** – The acceptance of certain types of materials shall be based on receipt of a Certificate of Compliance prior to incorporating the materials into the Project. This process is intended to speed the materials approval process and insure the correct

material is being used on the Project. The Certificate of Compliance shall meet the requirements of Section 2.25.3.

**Field Verification** – All materials permanently incorporated into the Work shall be field verified and documented by the Design-Builder’s inspector. The field verification or visual inspection shall occur prior to or during initial placement of materials. Field verification documentation should contain sufficient information to identify what was used including quantities. The field verification documentation must be signed and dated by the inspector at the time of verification. The field verification information should be the link between what was placed and paid for to what was specified by the Construction Quality Assurance Manager or approved on the RAM or QPL and its proper acceptance criteria.

**WSDOT Oversight** – The Design-Builder shall maintain files and distribute copies of all approvals and acceptance documents and make these available to the WSDOT. These documents shall be distributed to the WSDOT in a timely manner. The WSDOT will use these documents to verify the materials used by Design-Builder in performing the Work.

### 2.25.1.1.1 Mandatory Standards and Reference Documents

#### 2.25.1.1.1.1 Mandatory Standards

**General.** Design-Builder shall develop and implement the construction materials elements of the Quality Management Plan in accordance with the requirements of the Mandatory Standards listed in Table 2.25.2.1. The documents in Table 2.25.2.1 are listed in order of priority.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed Mandatory Standard as of the initial publication date of the RFP unless modified by Addendum or Change Order.

**Table 2.25.2.1**  
**Mandatory Standards for Control of Material**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1	WSDOT	Construction Manual	M47-01		
2	WSDOT	Materials Manual.	M41-10	2004	Std. Book

### **2.25.1.2 Fabrication Inspection**

The Design- Builder is responsible for the QA inspection and approval of items fabricated specifically for the Project. The Fabrication Inspectors will work under the direction of the Construction QA Manager. The qualifications for the Fabrication Inspector are covered in Section 2.26. WSDOT will manage the Quality Verification (QV) of the fabrication items. The Design- Builder will promptly notify WSDOT of the intended fabricator, fabricator inspector, and provide a copy of the “Approved” Shop Drawings.

For items identified as requiring minor inspection and approval, the Design- Builder’s QA Fabrication Inspector(s) shall perform random inspections of the fabricated item, review fabricators QC records, and provide a certification of compliance as appropriate for the type of material being inspected, and stamp or tag each approved item in accordance with WSDOT requirements in Section 9-1.5D of the Construction Manual.

For items identified as requiring major inspection and approval, the Design- Builder’s QA Fabrication Inspector(s) shall be at the fabrication facility for an estimated 20% of the fabrication time to perform random inspections of the fabricated item, review fabricators QC records, and provide a certification of compliance as appropriate for the type of material being inspected, and stamp or tag each approved item in accordance with WSDOT requirements in Section 9-1.5D of the Construction Manual. The amount of time for QA fabrication inspection can vary depending on the quality of product being produced.

The Design-Builder shall prepare a Fabrication QA Plan and submit for review as part of the overall Quality Management Plan. As a minimum the plan shall include:

- A. Describe the number of full-time equivalent employees with specific Fabrication Quality Assurance inspection responsibilities;
- B. List by discipline the name, qualifications, duties, responsibilities and authorities for all persons with Fabrication Quality Assurance inspection responsibilities;
- C. Describe the fabrication quality assurance inspection, sampling, testing, and analysis plan.
- D. Describe the frequencies for the fabrication inspections;
- E. Specify documentation for Fabrication QA inspection including acceptance documentation.

The fabricated items to be inspected include but are not limited to the following:

#### **Minor Inspection and Approval required:**

1. Treated timber and lumber except guardrail post and blocks
2. Treated piling
3. Epoxy coated rebar
4. Anchor bolts shipment
5. Type 1 raised pavement markers
6. Miscellaneous items that are shop welded

7. Miscellaneous galvanized steel items
8. Concrete and metal culvert pipe over 700 mm (27 inches) in diameter
9. Permanent precast concrete median barrier
10. Traffic signal, ITS and illumination standards
11. Utility vaults
12. Metal drainage castings
13. Precast concrete catch basins, manholes and inlets. This includes all sections and risers 6 inch and above
14. Metal bridge rail
15. Sign mounting hardware

**Major Inspection and Approval Required:**

1. Precast concrete panels
2. Prestressed concrete girders
3. Steel for bridges
4. Bridge bearings
5. Three sided structures

## **2.25.2 Acceptance of Materials**

### **2.25.2.1 General**

All field and laboratory materials testing by the Construction QA Manager will follow methods described in the Contract, in the WSDOT Materials Manual, or other recognized standards. The following provisions will apply when the Design-Builder uses the specifications or methods from the sources named below:

**ASTM** — American Society for Testing and Materials. The ASTM designation number refers to this society's latest adopted or tentative standard. The standard or tentative standard in effect on the bid advertising date will apply in each case.

Design-Builder will consider any revisions to become effective on December 1 of the year they are adopted.

Copies of any separate ASTM specifications or testing method may be obtained from: the American Society for Testing and Materials, 1916 Race Street, Philadelphia, PA.

**AASHTO** — American Association of State Highway and Transportation Officials. An AASHTO number refers to that organization's currently published (1) "Standard Specifications for Highway Materials and Methods of Sampling and Testing" or any adopted revisions, or (2) "Interim Specifications and Methods of Sampling and Testing Adopted by the AASHTO Subcommittee on Materials."

Any standards, revisions, and interim standards in effect on the bid advertising date will apply. Standards, revisions, and interim standards will be considered as becoming effective on December 1 of the year, which they are adopted.

Copies of “Standard Specifications for Highway Materials and Methods of Sampling and Testing” may be obtained from the American Association of State Highway and Transportation Officials, 917 National Press Building, Washington, D.C.

**Federal Specification** — U.S. Government Federal Stock Catalogue. The specification number refers to the most recent revision adopted by the General Services Administration. Revisions in effect on the bid advertising date will apply.

Design-Builder will consider any revision as in effect 60 calendar days after its adoption.

Copies of separate specifications listed in the Federal Stock Catalogue may be obtained at the prices indicated from the Business Service Center, General Services Administration, Regional Office Building, Seventh and D Streets, Washington, D.C.

**Other Publications** — Any other publication referred to in these Specifications or the special provisions will mean its latest edition. Requirements, and any revisions, in effect on the bid advertising date will apply. Design-Builder will consider them as in effect 60 calendar days after publication.

Copies may be obtained from the publishing organizations. For example, copies of standard grading and dressing rules may be obtained from: West Coast Lumber Inspection Bureau in Seattle, Washington or Portland, Oregon, and from the Western Wood Products Association, Portland, Oregon.

**WAQTC** — Western Alliance for Quality Transportation Construction. The WAQTC designation number refers to this alliance’s latest adopted or tentative standard. The standard or tentative standard in effect on the bid advertising date will apply in each case. Design-Builder will consider them as in effect 60 calendar days after publication.

Copies of any separate WAQTC testing method may be obtained from: The WSDOT Quality Systems Manager, State Materials Laboratory, PO Box 47365, Olympia, Washington, 98504-7365.

#### **2.25.2.2 Acceptance by F and t Test Analysis**

The Construction QA Manager shall be responsible for statistically evaluating QA test data and the WSDOT QV test data to determine the acceptability of the material tested. This evaluation will be performed by using the F and t Test analysis as described in Section 2.26.

The acceptance decision will consider results of Design-Builder Quality Assurance sampling and testing and WSDOT’s or their agent’s verification sampling and testing, and any dispute resolutions to resolve discrepancies between the verification sampling and testing and the Design-Builder Quality Assurance sampling and testing.

#### **2.25.3 Manufacturer’s Certificate of Compliance**

The Construction QA Manager may accept certain materials on the basis of a Manufacturer’s Certificate of Compliance as an alternative to material inspection and testing. When a Manufacturer’s Certificate of Compliance is authorized by these Specifications or the special provisions, the certification shall be furnished prior to use of the material.

The Manufacturer's Certificate of Compliance must identify the manufacturer, the type and quantity of material being certified, the applicable specifications being affirmed, and the signature of a responsible corporate official of the manufacturer and include supporting mill tests or documents. A Manufacturer's Certificate of Compliance shall be furnished with each lot of material delivered to the Work and the lot so certified shall be clearly identified in the certificate.

Any materials used on the basis of a Manufacturer's Certificate of Compliance may be sampled and tested at any time. Any material not conforming to the requirements will be subject to rejection whether in place or not. Construction QA Manager reserves the right to refuse to accept materials on the basis of a Manufacturer's Certificate of Compliance.

The Manufacturer's Certificate of Compliance shall meet the requirements of this Section. In lieu of placing the material without a proper Manufacturer's Certificate of Compliance the Design-Builder may request that Construction QA Manager sample and test the materials prior to incorporating them into the Project. For details regarding sample size and other requirements see Chapter 9-4 of the WSDOT Construction Manual.

#### **2.25.4 Acceptance of Small Quantities of Materials**

The Design-Builder may request the acceptance of small quantities of materials based on this provision.

Upon the request of the Design-Builder, the Construction QA Manager may elect to accept small quantities of materials without normal sampling and testing frequencies. The determination to accept materials using this provision rests solely with Construction QA Manager. Structural concrete will not be considered under the small quantity definition.

An item can be accepted as - small quantity if the proposed Project quantity for a specific material is less than the one subplot (quality assurance sample size) as defined in General Provisions Section 1-06, Table 6 or less than one-half of a subplot as defined in General Provisions Section 1-06, Table 6 for mainline paving.

Questions that the Design-Builder should and the WSDOT Engineer will consider prior to use of small quantity acceptance are:

Has the material been previously approved?

Is the material certified?

Is there a current mix design or reference design?

Has it been recently tested with satisfactory results?

Is the material structurally significant?

Small quantity acceptance may be accomplished by visual, certification, or other methods. Acceptance of small quantities of materials by these methods must be fully documented. Documentation of materials under these methods must be provided by the Design-Builder accepting the material. For visual acceptance, the Construction QA Manager shall have written documentation, such as an entry made in the Inspectors Daily Report, or noted on field records, with a statement as to the basis of acceptance of the material and the approximate quantity involved.

Small quantity acceptance may be used for any proposal quantity of the following uses:

Driveways

Road approaches

Paved ditches and slopes

### **2.25.5 Handling and Storing Materials**

In storage and handling, the Design-Builder shall protect materials against damage from careless handling, from exposure to weather, from mixture with foreign matter, and from all other causes. The Construction QA Manager will reject and refuse to test materials improperly handled or stored.

The Design-Builder shall repair, replace, or make good all WSDOT-provided materials that are damaged or lost due to the Design-Builder's operation or while in the Design-Builder's possession, at no expense to WSDOT.

### **2.25.6 PCC and HMA, Mix Designs and Batch Plants**

The Design-Builder, or their designee, shall develop the concrete mix design per the standard specifications. The Design-Builder's Construction QA Manager will certify that the concrete mix design conforms to the Contract Documents, including the Standard Specifications.

The concrete batch plant that the Design-Builder uses for the production of Portland cement concrete shall be a National Ready Mix Concrete Association (NRMCA) approved plant.

The Design-Builder, or their designee, shall develop the HMA mix design. They will determine the gradation, asphalt content, and anti-strip requirement according to the Standard Operating Procedure 732 in the Materials Manual, Section 5-04 and chapter 9 of the Standard Specifications. The Design-Builder's Construction QA Manager shall certify that the HMA mix design meets all of the requirements of the Contract Documents, including the Standard Specifications. The asphalt concrete plant(s) that the Design-Builder uses for the production of asphalt concrete shall meet all of the requirements as specified in the WSDOT Standard Specifications. The Design-Builder's QA shall inspect the asphalt concrete plant(s) and document that it meets all requirements.

The Design-Builder shall send a copy of the completed HMA mix design showing all trial blends and calculations, along with a sufficient amount of prepared aggregate for the Department to verify the adequacy of the proposed design. The verification effort by the Department will consist of mixing, at the determined asphalt content, eight (8) samples for checking the air voids, the stripping requirements, and the compactive effort. The use of the verified or non-verified HMA mix design shall be in accordance with the WSDOT Standard Specifications.

### **2.25.7 State Inspected and Tested Items**

There are certain items that WSDOT has determined are critical to the everyday operations of the roadway. These items would be inspected and tested by state forces to ensure that they meet state and federal requirements. These items include:

Highway Traffic Signs: All traffic signs will be inspected at the point of fabrication by the WSDOT department. All signs so inspected will be tagged by the WSDOT Fabrication inspector prior to shipment with a Sign Acceptance report sent to the Design-Builder.

Traffic Signal Controllers: All traffic signal controllers will be tested by WSDOT accordance with WSDOT SOP 429 at the State Materials Laboratory in Tumwater, WA. The Design-Builder is advised that the time necessary to test a controller is dependent upon the quality of the product submitted and the response time of the vendor in correcting deficiencies in the programming or circuitry. Typically it will take approximately 2 weeks for testing if everything is correct. Only controllers tested by WSDOT shall be installed.

## **2.26 QUALITY**

### **2.26.1 General**

**General Scope.** Design-Builder shall assume the primary responsibility for the overall quality of the Work, including products of Subcontractors, required fabricators, suppliers, and vendors under the oversight of the Department and in coordination with relevant governmental agencies.

The Design-Builder shall respond to all WSDOT audits, questions and request for information regarding quality issues when so requested by the Department.

### **2.26.2 Quality Assurance**

Design-Builder shall perform all of the Quality Assurance (QA) tasks required to ensure that the final Project complies with all of the terms of the Contract. These tasks shall include but not be limited to the following:

#### **2.26.2.1 Design Quality Control (DQC)**

Design-Builder shall perform all of the Design Quality Control checks outlined in RFP Appendix D, Draft Quality Management Plan.

Senior experienced engineers shall check all design Work. Senior experienced engineers shall be engineers that have significant relevant qualifications and experience in the design discipline and type of Work being checked and shall have an equal or higher level of qualifications and experience than the engineer(s) in the discipline being checked. Senior experienced engineers shall not check the Work they are involved in actually designing.

#### **2.26.2.2 Design Quality Assurance (DQA)**

Design-Builder shall perform all of the design audits outlined in RFP Appendix D, Draft Quality Management Plan, to substantiate that the required quality control checks and reviews are being performed and that the Project calculations and Design Documents comply with the Contract Documents.

#### **2.26.2.3 Construction Quality Control (CQC)**

Design-Builder shall perform all of the Quality Control (QC) inspection, sampling, and testing needed to ensure that the final installed Work meets or exceeds the requirements of

the Contract Documents. It is expected that the QC group will be part of the Design-Builders production organization and will work seamlessly with them to guarantee effective results.

Quality Control documentation is primarily for the use of the Design-Builder. The Department does not require copies of this information.

#### **2.26.2.4 Construction Quality Assurance (CQA)**

Design-Builder shall perform Construction Quality Assurance tasks as prescribed in the Approved Quality Management Plan. CQA provides inspection and testing verification that the Project was built in compliance with the Contract documents. Construction Quality Assurance is divided into two subcategories: Inspection Quality Assurance and Testing Quality Assurance.

In addition to the minimum qualifications outlined in Table 2.26.1, personnel performing IQA or TQA shall successfully complete 2 weeks of training (40 hours per week) before performing any CQA activities. CQA staff will conduct the training specifically for CQA personnel for the Project. Design-Builder personnel who fail to achieve an acceptable rating at the end of the training shall not be eligible to perform CQA functions.

##### **2.26.2.4.1 Inspection Quality Assurance (IQA)**

Design-Builder shall inspect and document all Project Work. This documentation shall demonstrate that all materials and equipment were installed in accordance with Contract Documents in conjunction with Department oversight inspections; these inspections will form part of the basis for Project Acceptance. The Design-Builder has the responsibility to demonstrate that the Work meets Contract requirements. Only WSDOT has the authority to accept the Work.

##### **2.26.2.4.2 Testing Quality Assurance (TQA)**

Design-Builder shall perform all Quality Assurance (QA) sampling and testing as required in General Provision Section 1-06.2 Table 6, Technical Specifications Section 2.25, and this Section 2.26.

#### **2.26.2.5 Documentation**

The Design-Builder has sole responsibility to maintain all construction workmanship and materials quality records of all CQA inspections, sampling and tests performed. Design-Builder shall provide all hardware, connections, and T-1 line. Design-Builder shall submit to the Department in electronic and hard copy format CQA inspection reports and material sampling and testing results within twenty-four (24) hours following the inspection or test. WSDOT will provide access to the WSDOT server for the Design-Builder to input test results. WSDOT will retain control on who has rights for data entry, read-write, delete, etc.

Design-Builder shall store the testing results in the WSDOT-provided materials database, and shall store QA Inspection Reports in a database provided and developed by the Design-Builder. The purpose of electronic storage of inspection reports and test data and results is to facilitate the retrieval and manipulation of information to promote timely and accurate decisions during the construction of the Project.

The electronic database shall be available for data entry no later than 60 days after Notice to Proceed or five days before the first CQA test, whichever is later. If CQA inspections and tests are made before that date, hard copy information shall be kept and entered into the database no later than 7 days after the system is available.

#### **2.26.2.6 Definitions**

**Construction Quality Organization (CQO):** The persons on the Design-Builder's team who are involved in Construction Quality Control and Construction Quality Assurance activities.

**Design Quality Organization (DQO):** The persons on the Design-Builder's team who are involved in Design Quality Control and Design Quality Assurance activities.

**Owner Verification Inspection (OVI):** Owner verification inspection is the oversight inspection of the Design-Builder's Work by the Department that includes:

- Department checks to see if design and construction meets the requirements of the Contract.
- The Department's participation in meetings.
- Audits of all documentation to confirm that the Design-Builder is achieving the Contract obligations and commitments.
- The Department's oversight verification inspection of items fabricated off-site, including but not limited to structural steel, and precast and prestressed concrete structures.

**Owner Verification Testing (OVT) (also referred to as OQVT, QVT, and QV):** Owner verification testing is the sampling and testing performed by the Department to check for Contract compliance, and includes material sampling and testing performed by Department personnel to statistically compare and validate the results of the CQA's tests, in accordance with Section 2.25.

**Quality Check Point (QCP):** A Quality Checkpoint is a point in time when construction has proceeded to a defined stage at which representatives of the Design-Builder and the CQA organization determine the progress to date by reviewing the following:

- All daily inspection reports
- CQO and OVT reports
- Settlement data
- Pile driving records
- String line measurements
- Audits and other pertinent data

The Design-Builder shall notify the Department 24 hours in advance of when a quality checkpoint will occur to give the Department's oversight representative the option to attend. If the Work is not in compliance, the CQA representative will notify the Design-Builder of the non-conformance. If the Work is in compliance, the CQA representative will recommend that the Work be accepted. No additional Work shall take place past the QCP until all parties mutually agree that the Work up to that point is acceptable.

**Quality Management Plan (QMP):** The plan described in Section 2.26 and RFP Appendix D. The plan included in RFP Appendix D is in a draft form, the format of which is acceptable to the Department. The Design-Builder shall complete this plan and augment it to match their approach to quality management. The final plan is subject to review and approval by the Department.

**Quality Organization:** The Design Quality Organization (DQO) is the Design-Builder's organization designated in the Proposal to manage and implement the Design Quality Management Plan (DQMP). The Construction Quality Organization (CQO) is the organization designated in the Proposal to manage and implement the Construction Quality Management Plan (CQMP).

### **2.26.3 Department Independent Assurance and Verification**

The Department will perform inspections and tests as described in the following paragraph to validate the Design-Builder's CQA inspections and tests and to ensure that the quality of the finished product meets the Contract requirements. The results of these inspections and tests along with Design-Builder CQA inspections and test data will form the basis for Final Acceptance.

The Department will perform Independent Assurance (IA) testing and inspection to validate the accuracy and reliability of the CQA testing and inspection.

The Department will also perform verification inspection and testing to confirm that the Work and materials meet Contract requirements. These inspections and tests will be performed at times and places selected by the Department. They will be totally independent of the Design-Builder CQA inspections and tests. The Design-Builder shall rectify any problems identified by the verification inspections and tests in a prompt and effective manner.

### **2.26.4 Department Authority**

***Department's Role.*** The Department's role in the construction quality program is to:

13. On a spot-check basis, actively participate in quality checkpoint (QCP) on-site meetings.
14. Review the CQA organization's statistical evaluation of the results of material sampling and testing.
15. Audit the Design-Builder's quality program activities to ensure adherence to the QMP.
16. Audit the CQA organization's records.
17. Conduct owner verification inspection and testing (oversight, sampling, inspection, and evaluation) and owner independent assurance (OIA)
18. Perform the final investigation, final audit of CQA records, and Final Acceptance of Work.

***Access to Testing Facilities.*** The Department reserves the right to:

- a. Check testing equipment for compliance with specified standards and check testing procedures and techniques.
- b. Access the testing facilities of independent testing agencies, at no additional cost to the Department, to witness testing and verify compliance of testing procedures, testing techniques, tester certifications, and test results.

***Right to Stop Work.*** If there is evidence that the QMP procedures are not adequate, or if a problem is encountered during the oversight reviews or becomes evident during construction, the Department may, at its sole discretion, stop Work until appropriate quality procedures have been established and implemented. In addition, the Department retains authority to stop Work without liability wholly or in part, if the Design-Builder fails to:

- a. Correct conditions that is unsafe for Project personnel or the general public.
- b. Correct unacceptable construction practices.

### **2.26.5 Quality Management Plan**

Included in RFP Appendix D is a draft Quality Management Plan (QMP) in a format and organization that shall be followed by the Design-Builder. As part of the proposal, the Proposer shall finalize and augment this plan based on its individual approach to Project quality management.

***General.*** Design-Builder shall develop and implement a written QMP, in close coordination with the Department and any relevant government agencies, for all elements of the Project, including, but not limited to, management, administration, design, construction, maintenance of public and private facilities, geotechnical investigations, and environmental monitoring and compliance. Develop the quality management plan (QMP) for the Project, subject to Department approval, using the draft QMP, in RFP Appendix D as a guide.

***Format.*** Design-Builder shall use the format in the draft QMP in RFP Appendix D.

***Department Approval.*** After Notice to Proceed, Design-Builder shall submit the QMP for formal Department review and approval. The Department will approve or disapprove the QMP submission within 10 business days of its submission. After QMP approval, submit any changes to the QMP Plan, quality program staffing levels, or Key Quality Personnel for written Department approval (in advance of their implementation). The QMP must be approved by the Department before any Work is performed on any element of the Project.

#### **2.26.5.1 Performance Requirements**

Design-Builder shall develop and maintain a quality program that maintains consistency in the Project's quality functions, as carried out by the Design-Builder, the DQA and CQA organizations, and the Department, and meets the following goals:

- a. Facilitates efficient and effective Project operations.
- b. Uses teamwork to overcome quality challenges.
- c. Enables the Design-Builder, the DQA and CQA organizations, and the Department to support each other.

### **2.26.5.2 Management Requirements**

**General.** In Section 1 (Management) of the QMP:

- a. Design-Builder shall describe the quality management organization, including the number of full-time equivalent employees and an organization chart showing the lines of authority and reporting responsibilities; and
- b. Design-Builder shall identify the name, position, qualifications, duties, quality management responsibilities, and authorities of each person proposed for a quality management function.

**Personnel.** For persons and organizations performing quality management functions:

- a. Design-Builder shall provide such persons and organizations with sufficient authority and organizational freedom to identify quality problems, and to recommend, provide, and verify implementation of solutions; and
- b. Design-Builder shall place such persons and organizations at an organizational level high enough to ensure that Contract Schedule, performance, or cost will not influence implementation of quality management measures.

#### **Management Review**

The Design-Builder's executive management shall review the Quality Management Plan at least quarterly, and more frequently if necessary, to ensure its continuing suitability and effectiveness in satisfying the requirements of this Contract and the Design-Builder's stated quality policy and objectives.

The Design-Builder shall invite WSDOT to participate in the management reviews.

The management reviews shall, at a minimum, review the results of internal audits, WSDOT audit results, corrective actions taken, trends in nonconformance, and time to resolution. The outputs of management reviews shall be incorporated into the Quality System.

### **2.26.5.3 Design-Builder Quality Control and Quality Assurance Staff**

At a minimum, Design-Builder Quality Assurance staff shall include the following:

#### **2.26.5.3.1 Design QA Manager**

##### **Job Description**

- Implement Design QA Plan. Train all design engineers in the design quality process. Audit design packages and release for construction plans for conformance with the QMP. Audit and certify all design packages for release to construction for compliance with the QMP. Ensure appropriate Engineers review all plan sheets for conformance with the RFP standards and criteria. Certify that the Design Documents, for which progress payments are being requested, meets the quality requirements of the Contract.

##### **5. Minimum Qualifications**

- Must be a registered professional engineer in the State of Washington as of the date of the Notice to Proceed, and have a minimum of 5 years recent experience managing design of highway projects.

### **2.26.5.3.2 Construction QA Manager**

#### **6. Job Description**

- The Construction Quality Assurance Manager manages the Design-Builder's Quality Assurance program and is responsible for demonstrating to the Department that the Work and materials are acceptable. Develops and implements the Design-Builder's construction QA plan, implements quality planning, oversees Design-Builder's construction quality assurance testing and inspection. Provides monthly certification of compliance of construction and materials for compliance with the Contract Documents and the Design Documents. Coordinates with WSDOT's verification testing and inspection and independent assurance requirements. Reports directly to the person/group with overall Project management responsibilities (design, construction, PI, quality, etc) and not to someone who exclusively has construction production responsibilities. Must not be assigned any other duties or responsibilities on the Project or any other projects. This person, or their WSDOT approved representative, will be required to be on Site whenever any construction activities are being performed.
- The Construction Quality Assurance Manager shall have the authority to stop any and all Work that does not meet the standards, specifications or criteria established for the Project.
- The Construction Quality Assurance Manager shall submit a final materials certification package to the Department.

#### **Required Licensure**

- Must be a registered professional engineer in the State of Washington as of the date of the Notice to Proceed.

#### **7. Minimum Qualifications**

- Must have at least 6 years experience in construction materials acceptance administration, and at least 6 years experience in construction inspection administration. The experience of an assistant to the Construction QA Manager may be used to meet the experience requirement of up to 6 years of either construction inspection or construction materials administration.

In addition, the Construction QA Manager or his designated representative shall be available or on the Project within four hours of being notified of a problem regarding the quality assurance of any Work being done by the Design-Builder, or any of its Subcontractors or agents.

### **2.26.5.3.3 Quality Testing Supervisor**

### Job Description

- The Quality Testing Supervisor shall oversee all sampling and testing operations and report directly to the Construction QA Manager. The Quality Testing Supervisor shall be responsible for insuring that qualified testers are performing all testing according to the proper test procedure, and using calibrated and verified testing equipment. The Quality Testing Supervisor may be an employee of the Design-Builder's QA laboratory, and shall be on the Site during testing.

### Minimum Qualifications

- The Quality Testing Supervisor shall meet one of the following requirements:
  - A. A Professional Engineer, registered in the State of Washington, with at least one year of highway materials testing experience acceptable to the Department, or
  - B. An Engineer-In-Training, certified by the State of Washington, with at least two years of highway materials testing experience acceptable to the Department, or
  - C. A Bachelor of Science Degree in Civil Engineering, Civil Engineering Technology, Construction, or related field acceptable to the Department; and at least three years of highway materials testing experience acceptable to the Department, or
  - D. Certification by the National Institute for Certification in Engineering Technologies (NICET) in the Construction Materials Testing field as an Engineering Technician (Level III) or higher in the appropriate subfield in which sampling and testing is being performed, or
  - E. Certification by NICET in the Transportation Engineering Technology field as an Engineering Technician (Level III) or higher in the Highway Materials subfield, or
  - F. Certification by NICET as an Engineering Technician, or higher, in Civil Engineering Technology with at least five years of highway materials testing experience acceptable to the Department, or
  - G. An individual with at least eight years of highway materials testing and construction experience acceptable to the Department.

### **2.26.5.3.4 Environmental Compliance Manager**

#### 8. Job Description

- Advise design team on how to avoid and minimize adverse effects to the natural environment and communities.
- Ensure and provide documentation that all Project environmental commitments are met.

- Ensure that Design Documents and construction complies with all environmental regulations, Project environmental documentation, and Project permits.
- Must be on Site for the duration of both the design and construction periods.

#### Minimum Qualifications

- 5 years experience managing environmental compliance for transportation projects.
- Experience working with engineering teams to develop designs that avoid and minimize adverse environmental and community impacts.
- Experience working with transportation and natural resource agencies obtaining permits and/or permit modifications.

#### **2.26.5.3.5 Testing Technicians**

The Design-Builder shall have all QA testing performed by qualified testers. The testers shall be qualified as defined in the requirements in AASHTO R-18. A testing technician currently qualified in concrete testing by the American Concrete Institute (ACI) (Level I) will be considered qualified in those concrete tests. The qualifications of the laboratory technicians employed by an AASHTO Accreditation Program (AAP) will be accepted for AASHTO test methods only when confirmed by the laboratory's training and evaluation records. The competency of the tester shall be re-evaluated at least annually in all tests they perform. The testing technicians performing the field and laboratory QA sampling and QA testing shall be employed by the Design-Builder or agents laboratory and supervised by the Quality Testing Supervisor.

#### **2.26.5.3.6 Restrictions on QA Staff**

The restrictions in the following table will apply to the Design-Builders Quality Assurance staff:

**TABLE 2.26.1 WASHINGTON STATE DEPARTMENT OF TRANSPORTATION – EVERETT HOV DESIGN-BUILD PROJECT**

POSITION	QA duties and responsibilities	Restrictions on who they get their paycheck from (their employer)	Restrictions on what they do	Restrictions on who they report to on the org chart	Expected qualifications for their position?
Construction QA Manager (Key personnel)	Included in Section 2.26.5.3	none	cannot have responsibility for construction "production". Cannot be the same person as the Quality Testing Supervisor	Directly to the person/group with overall Project management responsibilities	Included in Section 2.26.5.3
Quality Testing Supervisor (Key Personnel)	Included in Section 2.26.5.3	none	cannot have responsibility for construction "production". Cannot be the same person as the Construction QA Manager.	Project Manager or Construction QA Manager	Included in Section 2.26.5.3
Construction field inspectors	Inspect aspects of the Work in which qualified. Prepare Daily Inspection Reports. Document inspection of materials brought to the job site.	Cannot be employed by materials suppliers or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Construction QA Manager	Minimum of 4 years of qualifying experience in highway construction inspection
Field samplers and field testers	Take samples and tests necessary to meet the requirements of the Contract, specifications and plans.	Cannot be employed by materials suppliers or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Construction QA Manager or the Quality Testing Supervisor	Included in Section 2.26.5.3
Construction materials lab testers	Perform tests on various materials within the laboratory environment and in accordance with applicable procedures.	Cannot be employed by materials suppliers or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Quality Testing Supervisor	Included in Section 2.26.5.3
Design QA Manager (Key Personnel)	Included in Section 2.26.5.3	Could be an employee of the firm designated as the lead design firm, that employs the designer of record	cannot have responsibility for construction "production" Also cannot have been involved in the design that is being QA'd	Directly to the Project Design Manager or to the person/group with overall Project management responsibilities.	Included in Section 2.26.5.3
Fabrication QA Manager	Implement the Fabrication QA Plan. Manage inspection and testing of all off-site fabrication Work. Ensure all fabrication QA inspection staff has appropriate training and certification. Maintain NCR log. Schedule Quality Checkpoints. Maintain calibration records for fabrication test equipment.	Cannot be employed by fabricators, materials suppliers, or subsidiaries	cannot have responsibility for construction "production". May be the same person as the Construction QA Manager.	Must either report to the Construction QA manager or can be the Construction QA manager	WA PE license, 10 years experience in Fabrication inspection and Fabrication Quality Assurance, including qualification in welding, structural coatings, precasting
Fabrication QA Inspectors and testers	Daily Fabrication Inspection Reports. Prepare Materials Receiving Report to document inspection of materials during fabrication.	Cannot be employed by fabricators, materials suppliers, or subsidiaries	cannot have responsibility for construction "production"	Exclusively to the Fabrication QA manager (if used) or the Construction QA Manager	Must be qualified in test standards they perform, must use verified equipment
Environmental Compliance Manager (Key Personnel)	Included in Section 2.26.5.3	None	cannot have responsibility for construction "production"	Directly to the Project Manager or the person/group with overall Project management responsibilities	Included in Section 2.26.5.3
Environmental Compliance Inspectors	Assist in the review of the design and implementation of environmental BMPs and mitigation measures. Assist in the verification of regulatory compliance.	Cannot be employed by "constructors" or materials suppliers or subsidiaries	Cannot have responsibility for construction "production"	Directly to the Environmental Compliance Manager	Wildlife Biologist. Watershed Scientist. Soil Scientist, Revegetation Specialist, Prof. Environmental Engineer.

### **2.26.5.3.7 CQA Staff Qualifications**

**General.** CQA staff is required to be trained in the applicable procedures for inspection of Work, geotechnical and environmental monitoring, and material sampling and testing.

The professional training and experience of the CQA staff (including biologists, hydrologists, and geotechnical engineers) shall be commensurate with the scope, complexity, and nature of the activity to be inspected, monitored, or tested.

**Department Right To Remove.** The Department has the authority, by written notice, to have any of the following removed permanently from the Project:

- a. A tester who does not perform the CQA tests in accordance with the test methods
- b. A tester who does not report test results accurately
- c. An inspector or geotechnical or environment monitor who, in the opinion of the Department, does not exercise good judgment in the performance of duty
- d. A tester who is not certified per Contract requirements

**Certifications.** CQA personnel performing on-site inspection and material sampling and testing are required to have the certifications listed in Table 2.26.1.

### **2.26.5.3.8 CQA Staff Responsibilities**

The CQA inspection staff and geotechnical and environmental monitors shall check for compliance with all permits, environmental monitoring, and construction operations. Staff shall be on-site to monitor all field operations for their appropriate disciplines. Construction operations requiring continuous field sampling and testing shall proceed only in the presence of the assigned CQA staff personnel.

**Inspection.** All on-Site Work shall be inspected by the CQA staff, except that certain portions of the Work may be inspected by qualified individuals who are employees of or retained by manufacturers, vendors, or Suppliers, if approved in writing by the Department.

**Utilities.** The CQA's staff is responsible for the following:

- a. Coordinating with the Utility Owners and Design-Builder to ensure that adequate notification is provided to the Utility Owners for them to inspect construction activities performed on or around their utility.

**Department Oversight.** The Department's oversight staff will periodically review the Site performance and test results of the CQA staff. The CQA organization shall perform statistical reviews (including but not limited to normal distribution, control charts, percent within limits) of the inspection and test results and submit monthly summaries to the Department.

### **2.26.5.3.9 CQA Staffing Levels**

Identify QA staffing levels in the QMP. The staffing levels in the Proposal shall be updated in the QMP and again, as necessary, during the course of the Project to reflect the actual construction schedule. The size of the CQA staff shall reflect the complexity, needs, shifts,

and composition of the construction activities consistent with the Contract Schedule, relative locations of the Work to be covered, geotechnical considerations, environmentally sensitive areas, and specific nature of the Work. The Department will review and comment on proposed staffing levels for adequacy in meeting Project needs. Construction shall not take place when CQA staffing levels are inadequate to provide the inspection and testing required by the Contract.

#### **2.26.5.4 Administration Requirements**

**General.** In Section 2 (Administration) of the QMP, describe the procedures for coordinating and ensuring the consistency and quality of all Work performed or provided for the Project by all participants.

##### **2.26.5.4.1 Personnel Qualifications and Certifications**

In the QMP, specify procedures that:

- a. Familiarize all personnel with all requirements of the Contract Documents pertaining to their responsibilities;
- b. Educate, train, and certify (as appropriate) personnel performing activities affecting or measuring the quality of the Work and ensure that they achieve and maintain reasonable proficiency; and
- c. Ensure that personnel performing the Work do so according to the QMP.

##### **2.26.5.4.2 Document Control**

**General.** In the QMP, Design-Builder shall specify procedures for meeting documentation requirements and document control for the filing of design criteria, reports and notes, calculations, plans, specifications, schematics, support materials, QA inspection and test reports, etc., and for the specific responsibilities of personnel to satisfy these requirements. Design-Builder shall maintain all such documents for the duration of the Contract and organize, index, and deliver them to the Department upon Final Acceptance as well as within five (5) business days of receipt of any such request from the Department. Use a format for the documentation that is acceptable to the Department. In the QMP, identify by name the document control supervisory personnel for the maintenance and management of records and documents pertinent to QA activities. The Department strongly encourages using videotaped and electronic documentation of the Project.

##### **2.26.5.4.3 Change Documentation**

**General.** In the QMP, Design-Builder shall specify measures to control the receipt and issuance of documents, such as instructions, procedures, drawings, and any changes thereto, which prescribe activities affecting quality. With these measures, Design-Builder shall ensure that approved documents, including all authorized changes thereto, are reviewed for adequacy, approved for release by authorized personnel, and distributed to and used at the locations where the prescribed activity is performed. Design-Builder shall ensure that any changes to documents are reviewed and approved by the same organizations that performed the original review and approval, unless the Department allows, in writing, another responsible organization to perform such reviews and approvals.

#### **2.26.5.4.4 Audits**

**General.** In the QMP, Design-Builder shall specify a comprehensive series of planned periodic audits to determine the effectiveness of the Quality Program, and shall require that audits be performed by appropriate trained personnel of the QA organization in accordance with the written procedures or checklists. For audit results, Design-Builder shall specify that the management having responsibility in the areas audited shall document, review, and act upon them. The QA auditor shall take follow-up action, including re-audit of deficient areas, as indicated.

#### **2.26.5.4.5 Design Changes**

**General.** In the QMP, Design-Builder shall specify procedures for tracking and distributing design changes made after the release-for-construction design drawings.

#### **2.26.5.4.6 As-Built Plans**

**General.** In the QMP, Design-Builder shall specify procedures to be used in preparation and submission of the final As-Built Plans to ensure accurate and timely documentation of the constructed Project.

#### **2.26.5.4.7 Scheduling Reviews and Submittals**

**General.** For each design item, segment, or construction phasing review, Design-Builder shall include oversight reviews in the Initial Contract Schedule Update and Contract Schedule Updates. Design-Builder shall keep the Department, and other affected governmental Agencies up to date on the exact timing of reviews with day-to-day communications. Design-Builder shall allow five (5) business days in the schedule for each milestone review and 10 Working Days for each full review of designs.

Design-Builder shall bear the schedule impacts of revisions arising from the Department's and municipality's review to the extent caused by noncompliance of the Design Documents with Contract requirements, including the Department's time for reviewing revisions.

Design-Builder shall coordinate frequently and early regarding resolution of previously identified issues.

#### **2.26.5.4.8 Progress Payment Documentation by QA Organization**

**Material Sampling Tracking.** The CQA shall obtain and track manufacturers’ certificates for all materials accepted by certifications and shall document receipt of “Approved for Shipment” certificates. A manufacturer’s certificate of compliance may be used for acceptance of materials as provided in Section 2.25.

**Quality Documentation.** The CQA Manager shall review monthly progress payment requests to ensure that acceptable quality documentation is on file for all payment items.

#### **2.26.5.4.9 Contract Price Adjustments**

**Quality-Based Price Adjustments.** The CQA Manager shall be responsible for calculating the statistical acceptance of materials as required in Section 1-06.2 of the General Conditions, calculating any indicated price reduction, and submitting the calculations to the Department for review and approval.

The Department will base any price reduction on the documentation of testing and inspection results provided by the CQA Manager and subsequently approved by the Department, the quantity of noncompliant materials, and/or additional OVT.

#### **2.26.5.4.10 Documentation**

**General.** Design-Builder shall collect and retain each of the following types of data in written form during the performance of the Work, all of which shall be in a form acceptable to the Department, and shall make this documentation available to the Department daily throughout the Project.

**Daily Manpower and Equipment Reports.** Maintain daily manpower and equipment reports for construction-related activities, and require subcontractors to do the same.

**Daily Occurrence Log.** Maintain, in narrative form, a daily occurrence log of construction activities by the CQA or its designee(s). In this log, document all significant occurrences on the Project, including:

- a. Unusual weather
- b. Asserted Force Majeure events
- c. Events and conditions causing or threatening to cause any significant delay, disruption, or interference with the progress of Work
- d. Significant injuries to a person or property
- e. All activities on the current Contract Schedule Update that are being actively prosecuted
- f. (In a standard format) all labor, materials, and equipment expenses incurred

**Hazardous Materials.** For hazardous material remediation Work, maintain the data required by the QMP in Section 6 (Environmental Requirements) separately for each Site.

**Utilities.** The QA organization shall:

- a. Oversee coordination with Utilities

- b. Document (for the Project team's use) design, construction, rework, and protection of Utilities
- c. Maintain the above-required data separately for each Utility facility

**Quality Records.** Design-Builder shall document all quality, inspection, and test activities, any delays encountered; Work that does not conform to the requirements of the Contract and Design Documents and the corrective actions taken regarding such nonconforming Work.

**Monthly Certification.** As part of the monthly progress payment request, Design-Builder shall provide a written certification signed by the Design QA Manager and the Construction QA Manager, indicating that the QMP and all of the measures and procedures provided therein are functioning properly and are being fully complied with, that the Work meets the requirements of the Contract, and that the Work meets the RFC plans and specifications.

**CQA Manager Weekly Reports.** The CQA Manager shall also maintain and submit weekly records with evidence that all required activities and/or tests have been performed, including the following:

- a. Type, number, and results of all current quality management activities, including reviews, inspections, materials analysis, tests, audits, and monitoring of Work performance
- b. Closely related data, such as the qualifications of personnel and the procedures and equipment used
- c. Identity of the inspector or data recorder, the type of test or observation employed, the results and acceptability of the Work
- d. Minutes of all QA meetings
- e. The nature of any nonconforming Work causes for rejection, etc.
- f. Proposed corrective actions(s) for any nonconforming Work, corrective action(s) taken, and results of corrective action(s)

The Department reserves the right to inspect and review these documents at any time.

**Weekly Scheduling Notice to Department.** Design-Builder shall notify the Department in writing by Thursday noon of each week of planned construction activities, including fabrication. In this notification, Design-Builder shall describe the anticipated construction activities for the following week (Monday through Sunday) to allow the Department to schedule its resources. For activities (fabrication, etc.) occurring beyond 60 miles of the Project area, give the notification at least 10 Business Days before the planned Work.

***CQA Final Inspection.*** At the Physical Completion of Work, the CQA Manager shall jointly conduct a final inspection with the Department, including inspection of Work and associated As-Built Plans, certifications, other documentation, and Design-Builder clean-up requirements. The CQA Manager shall accomplish this inspection within five (5) business days of notification that the Project is ready for final inspection. During the inspection, the CQA Manager shall examine the Work and review CQA documentation. The Department and the CQA Manager will jointly agree upon a list of nonconforming Work and include the list in quality documentation with an agreed-upon date of correction for each deficiency.

***Design-Builder Corrections.*** Design-Builder shall ensure that each deficiency identified during the final inspection has been corrected before the agreed-upon Physical Completion date.

***Final Certificate of Compliance.*** At Physical Completion of the Project, Design-Builder shall submit with the final invoice a Certificate of Compliance, signed by the Project Manager and CQA Manager, indicating that all materials incorporated in the Project conform to the Contract requirements.

***Final Owner Acceptance.*** The Department has sole responsibility and authority for the acceptance of all Work.

#### **2.26.5.5 Investigations and Testing Requirements**

***General.*** In Section 3 (Investigations and Testing) of the QMP:

- a. Describe procedures for coordinating and ensuring the consistency and quality of materials and products supplied by various vendors;
- b. Describe procedures for ensuring the quality and documentation of Project field investigations, including geotechnical investigations and testing, field surveying, and the Project mapping coordinate system, and traffic counts; and
- c. Include assurance of the qualifications of all laboratories.

#### **2.26.5.6 Design Requirements**

***General.*** In Section 4 (Design) of the QMP, Design-Builder shall describe design quality management practices and processes that are intended to:

- a. Place responsibility for design quality on the Design-Builder;
- b. Ensure that Work is designed and built in accordance with the Contract;
- c. Ensure that all Design Documents are prepared in accordance with generally accepted design and engineering practices, and meet all the requirements of the Contract; and
- d. Allow the Department to fulfill its responsibility to exercise due diligence in overseeing the design process and design products.

##### **2.26.5.6.1 Quality Requirements**

***Quality Procedures.*** In the QMP, Design-Builder shall specify procedures for ensuring the

quality of all design plans, specifications, reports, calculations, and other Design and Construction Document. Design-Builder shall formulate these procedures to ensure that appropriate quality requirements are specified and included in all Design Documents and that deviations from such requirements are controlled. For any deviations from these procedures, Design-Builder shall obtain the advance written approval of the Department.

#### **2.26.5.6.2 Design Checks**

**Quality Procedures.** In the QMP, Design-Builder shall specify quality procedures for preparing and checking all plans, specifications, calculations, reports, and other documentation submitted to the Department to ensure that they are independently checked and back-checked in accordance with generally accepted engineering practices. Design-Builder shall include specific procedures for verifying computer programs used and their output, and the process and procedures that the DQA managers will employ to demonstrate that the QMP is understood and followed by the design personnel. Design-Builder shall clearly identify the design engineer and checker on all final Design and RFC Documents.

#### **2.26.5.6.3 Design Adequacy**

**General.** In the QMP, Design-Builder shall specify the level, frequency, and methods of checking the design adequacy of the Project, including the methods by which all Design Documents, calculations, and reports shall be independently checked, verified for adequacy of design, and back-checked in accordance with generally accepted design and engineering practices by senior experienced engineers from the Design-Builder's staff.

#### **2.26.5.6.4 Design Coordination**

**General.** In the QMP, Design-Builder shall specify detailed procedures for coordinating Work performed by different persons, firms, or disciplines on related tasks, in the same geographic area, or in adjacent geographic areas. Design-Builder shall formulate these procedures to ensure that, under such circumstances, no conflicts, omissions, or misalignments occur between drawings or between the drawings and the specifications, and that the Design-Builder coordinates the review, approval, release, distribution, and revision of documents. Such procedures could be an interdisciplinary review process, conflict identification process, omission identification process etc.

#### **2.26.5.6.5 Unique Design Features**

In the QMP, Design-Builder shall specify those elements of the Contract Documents and, Design Documents that require special attention to or emphasis on quality, including applicable standards of quality or practice to be met, level of completeness, and/or level of detail required.

#### **2.26.5.6.6 Design Changes**

**Initiation.** Both the Design-Builder and the Department may initiate design changes (during design or after final design).

**Appropriate Changes.** The Department may deem design changes to be appropriate for several reasons, including errors in the final Design Documents, unexpected or changed conditions in the field, and design alternatives proposed by field or other personnel.

**Invalid Change.** Requests for information (e.g., earthwork settlement releases, additional alignment information, and dimensions) and design engineer evaluation of nonconforming constructed Work do not constitute valid design changes. Design changes to make constructed or partially constructed Work acceptable will not be allowed.

**Procedures.** In the QMP, Design-Builder shall include a process to propose, receive, track, respond to, and distribute design changes, and to identify the general goal, the participants, the participants' responsibilities, and a Work process for each change. Design-Builder shall request review by the Design QA Organization and the Department of all design changes. The Design QA Organization, the Department, and the Design-Builder shall jointly determine the procedures and timing of reviews, with the mutual understanding that a timely and expeditious design change process benefits all parties.

**Quality Checks.** For all design changes, Design-Builder shall perform the same quality checks as were performed on the original design, and conform to all provisions of the Contract. Design-Builder shall make no design change without first obtaining the written approval of the Engineer of Record or a Professional Engineer licensed in the State of Washington employed by the same firm as the Engineer of Record. Design-Builder shall require that all design changes, including but not limited to plans, sketches, memoranda, specifications, calculations, and reports shall be signed, stamped, and dated by a Professional Engineer licensed in the State of Washington.

Design-Builder shall make no design change affecting a Utility without obtaining the written approval of the appropriate Utility Owner.

**Certification.** In all cases, the DQA Manager shall certify in writing that the design change:

- a. Has been designed in accordance with Contract requirements
- b. Has been checked in accordance with the approved QMP; and
- c. Is consistent with other elements of the original design.

#### **2.26.5.6.7 Design-Builder's Design Quality Control Checks**

**General.** Design-Builder shall require, at a minimum, that a senior experienced engineer check all designs, including making independent calculations for all structural elements. If a checking engineer is not available within the design firm or if the design firm does not have a documented, operative, and effective quality program consistent with the approved QMP, Design-Builder shall employ an independent firm to conduct the quality checks. The DQA organization shall have a documented, operative, and effective quality program consistent with the approved QMP.

#### **2.26.5.6.8 Design Reviews**

##### **2.26.5.6.8.1 General**

**DQA Review.** The DQA Manager will review all designs to ensure the development of the Design Documents are in accordance with the requirements of the Contract.

**Department Review.** The Department will audit, as needed, the DQA processes and Design Documents to verify compliance with the Contract Documents. The Department will be

invited to attend all reviews.

**Participation.** Design-Builder shall require, at a minimum, that the Engineer of Record and the appropriate design manager(s) for the discipline(s) involved in the design (e.g., structures design manager and highway design manager) be present for and participate in all reviews.

**Document Copies.** For any type of review, the Department reserves the right to take to its offices copies of Design Documents being reviewed for further review and examination.

#### **2.26.5.6.8.2 Oversight Reviews**

**General.** The DQA Manager shall conduct oversight reviews, and the Department may participate in these reviews and comment as requested or as it otherwise deems necessary. These reviews will be conducted in the office of either the Design-Builder or its Engineer of Record and in the presence of the design personnel, with the intent of minimizing disruption of ongoing design Work. The DQA Manager, and design staff, shall jointly determine the materials to be compiled for each review. Formal assembly and submittal of drawings or other documents will not be required, but the Design-Builder is encouraged to provide informal submittals to facilitate reviews. The review may be of progress prints, computer images, draft documents, working calculations, draft specifications or reports, or other design documents. If mutually agreed upon for specific review items, the over-the-shoulder review may consist of a transfer of electronic files.

#### **2.26.5.6.8.3 Milestone (30%, 60%, and 90%) Reviews**

**General.** The DQA Manager will conduct formal milestone reviews at the 30%, 60%, and 90% (or as otherwise agreed by the WSDOT and Design-Builder) stage of Project elements to determine whether the Contract requirements and Design Documents are being followed and that QC/QA activities are following the approved QMP. For these reviews, Design-Builder shall prepare a formal design submittal to the DQA Manager that includes, as a minimum, design drawings, calculations (as appropriate), reports, specifications, geotechnical data, environmental requirements, and any other relevant design information. The DQA Manager shall compile and maintain documentation of the review. The Department will be invited to attend these reviews.

**Structures.** The Department will participate in a full review of all structures at the type, situation, and layout (TSL) (Sheet Ones) stage of design.

#### **2.26.5.6.8.4 100 % Design Reviews**

When the Engineer of Record has completed a design package to 100% and the package has been checked and audited, a formal design submittal shall be assembled and distributed for review, including plan sheets, calculations, specifications, and other pertinent data. The Designer shall prepare for these reviews a full set of drawings and other documents stamped “Checked and Ready for Review.”

**Redline Documentation.** Design-Builder shall develop a method to redline the 100%-design review package, then use it to document the comments provided by the DQA Manager and the Department at the 100% review.

**Redline Incorporation.** Design-Builder shall develop a method to document the

incorporation of redlined 100% review comments in the final design, and shall incorporate the review comments and resolve any remaining design questions to the Satisfaction of the DQA Manager and the Department.

#### **2.26.5.6.8.5 Release for Construction Review**

After the 100% comments have been addressed and the design documents have been checked, audited, and reviewed by WSDOT, a "Released for Construction" submittal package shall be assembled and distributed by the Design-Builder.

RFC designs for bridge foundations shall include submitting to WSDOT the geotechnical evaluation memo, geotechnical pile design calculations, and the seismic design memo.

***Certification.*** When a design package is ready to be released for construction, the DQA Manager shall certify all of the following related to the Work:

- a. The Design Documents are in accordance with the Contract requirements.
- b. The Design Documents have been checked in accordance with the approved QMP.
- c. No design exceptions exist that have not previously been approved by the Department.

#### **2.26.5.6.8.6 Final Design Review for Design of Entire Project**

***Final Design Submittal.*** When construction of the entire Project is completed, Design-Builder shall prepare a formal final design submittal for the entire Project that includes:

- a. All Design Documents
- b. Design calculations
- c. Design reports
- d. Specifications
- e. Estimated quantities
- f. Electronic files, in the format(s) specified in the Proposal documents
- g. All As-Built Plans information

***Department Acceptance of Final Design.*** All plans, reports, and specifications shall be signed and stamped by the Engineer of Record. The Department will conduct its review and accept or reject the final design package within 20 Business Days of receipt of the final Design Documents.

#### **2.26.5.6.9 Design Review Documentation**

***Records.*** Design-Builder shall prepare a written record of each design review, including informal oversight reviews:

- a. List the participants in each review or visit.

- b. Report all items discussed.
- c. Identify discrepancies noted and report corrective action(s) taken or planned.
- d. Identify follow-up action items, due dates, and the responsible party.
- e. Identify items needing resolution and time constraints for resolution.

**Reports.** Design-Builder shall maintain a record of internal quality activities and summarize them in monthly progress reports. Design-Builder shall submit to the Department a report of each design review, including oversight visits, within five (5) Business Days of the completion of the review or visit.

#### **2.26.5.6.10 Acceptance of Design**

**General.** Department acceptance of the Design Documents occur essentially at the time of acceptance of construction. The DQA Manager shall submit all documents required for final approval, with a certification that the constructed Work has been built in conformance with the Contract Documents, Design Documents, and approved by the DQA Manager.

#### **2.26.5.6.11 Quantity Estimate**

**General.** Design-Builder shall provide quantity estimates as needed to demonstrate that the minimum sampling and testing frequencies are in compliance.

### **2.26.5.7 Construction Requirements**

**General.** In Section 5 (Construction) of the QMP, describe construction quality management requirements that are intended to:

- a. Place responsibility for construction quality on the Design-Builder.
- b. Ensure that Work is constructed in accordance with the Contract, and Design Documents.
- c. Allow the Department to fulfill its responsibilities of exercising due diligence in overseeing the construction.

**Goal.** It is the goal of the Department to have the Project constructed with the highest quality of workmanship and with the least adverse impact on the public, the environment, and long-term maintenance costs.

#### **2.26.5.7.1 Work Conditions**

**General.** In the QMP, Design-Builder shall specify procedures to ensure that all activities affecting the quality of the Work are accomplished under suitably controlled conditions, using appropriate equipment, and with assurance that all prerequisites to the proper accomplishment of a given task have been satisfied. Design-Builder shall coordinate these activities with the Design-Builder's safety representative.

#### **2.26.5.7.2 Quality Procedures**

**General.** In the QMP, Design-Builder shall describe specific procedures to be followed to ensure that all the Work conforms to all requirements in the Contract Documents and the Design Documents being used as the basis for construction, and that all materials, equipment and elements of the Work incorporated in the Project will perform satisfactorily for the purpose intended. Design-Builder shall specifically include the procedures for inspecting, sampling, testing, checking, and documenting the Work, including all Work performed by Subcontractors.

#### **2.26.5.7.3 Materials**

In the QMP, Design-Builder shall specify procedures and measures that demonstrate compliance with Sections 1-06, 2.25, and 2.26.

#### **2.26.5.7.4 Inspection**

**Work.** In the QMP, Design-Builder shall describe a program for inspection of all Work, including examinations, measurement, and tests of materials or elements for each Work operation, where appropriate, to verify quality. Design-Builder shall not limit such inspections to those required for quality testing purposes. If the Design Documents specify mandatory inspection points that require witnessing or inspecting by the CQA and approval of the designated representative before Work shall proceed, Design-Builder shall indicate the specific inspection points in all appropriate documents.

**Production Plants.** In the QMP, Design-Builder shall specify procedures for plant inspection for production of hot-mix asphalt, PCC, and structural concrete.

#### **2.26.5.7.5 Field Procedures**

**Quality.** In the QMP, Design-Builder shall specify procedures to address all elements that affect Project quality in production, placement, and finishing (i.e., surfacing, embankments, paving, and structural concrete). Design-Builder shall include elements such as management and process control personnel, testing equipment and laboratory facilities, testing frequencies, aggregate production, stockpile management, proportioning, mixing and processing, transporting, placing, spreading, depth or thickness, finishing, compaction, joints, and mix designs.

#### **2.26.5.7.6 Dispute Resolution**

**System.** In the QMP, Design-Builder shall provide a process in conformance with Section 2.26.5.7.10 to resolve disputes that may arise in the CQA sampling and testing process. If the dispute resolution system includes a dispute resolution laboratory (DRL), the DRL must not be a participant in the quality process of either the Design-Builder or the Department, is AASHTO accredited, and approved by the quality assurance team.

Design-Builder shall maintain all materials for the dispute resolution laboratory.

#### **2.26.5.7.7 Shop and Falsework Drawings**

In the QMP, specify personnel assigned to shop drawing review and approval, including falsework drawings and other critical structure shop drawing; procedures for documenting reviews and approvals and for obtaining corrective action, when necessary; and procedures

for checking compliance with shop drawing and falsework drawing requirements.

#### **2.26.5.7.8 Testing**

**Test Procedures.** In the QMP, Design-Builder shall specify written test procedures for all testing required to demonstrate that all materials, equipment, and elements of the Work will perform satisfactorily for the purpose intended and will meet the standards specified in the Contract Documents and the Design Documents. In the test procedures, Design-Builder shall incorporate the requirements and acceptance limits contained in applicable Design Documents, and include provisions for verifying that all prerequisites for the given test have been met and that adequate test instrumentation is available and used. Design-Builder shall require test results to be documented and evaluated to verify that test requirements have been satisfied.

**Equipment Certifications.** In the QMP, Design-Builder shall specify measures to ensure that tools, gauges, instruments, and other measuring and testing devices used in activities affecting quality are properly maintained, controlled, calibrated, certified, and adjusted at specified times or frequencies to maintain accuracy within necessary limits.

**Instrumentation.** In the QMP, Design-Builder shall specify procedures and personnel to be used to ensure that specified instrumentation is installed, maintained, and monitored in accordance with applicable specifications.

**Coordination.** In the QMP, Design-Builder shall set forth a program to coordinate inspections and testing by local agencies and Utility Owners.

**Qualification of Laboratories.** Laboratories must meet the requirements of Section 2.26.5.7.11.

**Field Laboratories.** Satellite (field) laboratories may be used, where appropriate, for testing. Equipment in the satellite laboratories shall meet the requirements of Section 2.26.5.7.11. The laboratory shall have written policies and procedures to ensure the satellite laboratories performing testing activities on the Project are capable of providing testing services in compliance with applicable test methods. The policies and procedures shall address inspection and calibration of testing equipment, as well as a correlation-testing program between the accredited laboratory and portable or satellite facilities.

**QA Test Reporting.** Design-Builder shall use a Department-approved standardized form for reporting CQA test results, and the Design-Builder shall enter all QA test results into the Department-provided materials test database.

#### **2.26.5.7.9 Materials Testing Frequencies and Random Sampling**

Materials Quality Assurance, (QA), sampling and testing frequency will be performed in accordance with General Conditions Section 1-06 Table 6, the WSDOT Construction Manual, WSDOT Materials Manuals, WSDOT Standard Specifications, or other Contract Documents.

Materials Quality Verification, (QV), sampling and testing will typically be performed at a rate of one (1) verification test to every five (5) of the design-builder's acceptance testing.

During production startup testing may be required on a more frequent basis until the process is established to be under good control. When QV testing reaches 25 samples, and the QA and QV testing can be statically validated, the frequency of the QV tests can be reduced to 1 in 20. If at any time the QA and QV testing can not be validated, then the QV testing frequency shall be reduced to 1 in 5 until 25 samples are reached again with satisfactory statistical validation.

For all materials that are not addressed by WSDOT standards, material-testing specifications, testing procedures, and frequencies will be determined by the Materials Quality Assurance Team with concurrence of the Engineer of Record.

All acceptance and verification sampling and testing shall be randomly obtained, at the location and frequency stated in the Contract documents. The Design-Builder shall provide to WSDOT a testing plan for each material. The testing plan shall be developed using a Random Numbers Table and reflect the proposed total Project quantity. The testing plan shall be submitted prior to the beginning of production or placement of the material.

When small quantities of materials are to be used, they can be accepted without sampling and testing when the quantity of materials proposed for use by the Design-Builder are less than the minimum sampling and testing frequencies. Structural concrete will not be considered under the small quantity definition. The Construction QA Manager shall follow the procedure for acceptance of small quantities found in Section 2.25.4.

#### **2.26.5.7.10 Materials Quality Analysis Program**

The Design-Builder sampling and testing results may be used for acceptance provided that they are validated by WSDOT's verification sampling and testing

Both the Design-Builder QA and the WSDOT's QV test result will be recorded in the Statistical Analysis of Materials Software that has been provided by WSDOT to statistically evaluate the test data to determine the acceptability of the material tested. This evaluation will be performed using the F and t Test analysis. The Construction QA Manager shall be responsible for performing the evaluation. Any test data that fails the F test or t test shall be reviewed by the Quality Assurance Team and a determination made as to what remedial action is necessary.

The Quality Assurance Team shall make cooperative effort by the Design-Builder and WSDOT to identify the cause of discrepancies in test results. The Quality Assurance Team must generate a report for the materials files defining what the problem was, the cause of the problem, and the solution to prevent the problem from happening again. As a minimum, the review should include the following actions:

- A check of test data, calculations and results;

- Observation of the sampling and testing by the Independent Assurance Inspector;

- Check of test equipment by the Independent Assurance Inspector.

If the Quality Assurance Team fails to identify the cause of discrepancies in test results, then the WSDOT's test results shall be used for acceptance.

When certain attributes of a material are not statistically evaluated for acceptance, such as concrete slump, entrained air content, and temperature for concrete, and the differences between the Design-Builder's test results and verification test results exceed the values for precision and bias as found in the testing procedure, placement of the material shall be halted until the Design-Builder can demonstrate that the material is within the required specifications.

#### **2.26.5.7.11 Materials Testing Laboratory**

All QA testing will be performed by a WSDOT approved laboratory reporting directly to the Design-Builder's Construction QA Manager. The Design-Builder, or a sub contractor, may employ the laboratory personnel. To avoid conflict of interest requirements, the materials testing laboratory that is used for QA testing shall not be owned, operated, equipped, or staffed by material suppliers. The laboratory shall meet the requirements of AASHTO R-18 for qualified testers and calibrated/verified equipment and be able to accomplish the testing according to the test procedure they are performing.

The Design-Builder shall develop and maintain a Laboratory Quality Systems Manual. The manual shall include:

- Staff qualifications, position description, and qualification process
- Listing of test procedures used,
- Equipment, including verification and calibration procedures and inventory
- Test reports, worksheet, and forms
- Sample management
- Diagnostic and corrective action
- Quality systems review

WSDOT approval of the laboratory will be required. WSDOT will perform an on-site evaluation of the facility to ensure all Work is being performed in accordance with the Contract Documents. The evaluation includes both audit and inspection functions, including reviewing training records, reviewing equipment calibration and verification records, and witnessing DB testers performing the test procedures.

The laboratory shall be properly equipped, staffed, and fully operational for WSDOT inspection a minimum of five (5) days prior to start of Work. The Design-Builder will be advised in writing of any deficiencies noted during WSDOT inspection and must take immediate action to correct the noted deficiencies. Work will not be permitted to proceed until the laboratory and staff is inspected and has received written approval from WSDOT.

The test equipment for the following test procedures shall be as shown so that proper correlation between the QA and QV test results may be established.

WSDOT Field Operating Procedures, (FOP), for AASHTO T308 Asphalt Content by Ignition Method (Barnstead Thermolyne Model F85938 or other approved ignition furnace with internal balance).

WSDOT FOP for AASHTO T-310 and WSDOT FOP for WAQTC TM8 In-place Densities by Nuclear Method (Troxler 3430 Series Moisture/Density Gauge)

#### **2.26.5.7.12 Materials Quality Team**

The Design-Builder and WSDOT will jointly form and participate in a Materials Quality Assurance Team. The Construction QA Manager will be responsible for setting the meeting schedule, agenda, and documenting the meeting attendees and minutes. The meetings will be held as needed to address all quality issues on the Project. It is suggested that meetings occur every two weeks or more often if it is determined that a problem exists concerning materials.

The purpose of the meetings will be to discuss any issues of poor quality, processes that are unstable or out of good control, evaluation of disagreement between QA and QV test data, future quality concerns, and any issues that WSDOT or the Design-Builder may have about the materials quality of the Project. The quality team will address materials sampling, testing and acceptance of materials that is not addressed within the Section Control of Materials to determine the method for the acceptance of those materials.

It is recommended that the Design-Builder designate to the Materials Quality Assurance Team their personnel in charge of QC and QA, superintendents, and others who have quality concerns. It is recommended that the Department designate to the Materials Quality Assurance Team our chief manager, Project engineer, field engineers, and others who have quality concerns.

#### **2.26.5.7.13 Fabrication Inspection**

The fabrication inspectors that are responsible for acceptance of structural steel shall be qualified as follows:

The Inspector shall be an AWS Certified Welding Inspector (CWI) qualified and certified in accordance with the provisions of AWS QCI, Standards for Qualification and Certification of Welding Inspectors, or, the Inspector shall be qualified by the Canadian Welding Bureau (CWB) to the requirements of the Canadian Standard Association (CSA) standard W178.2, Certification of Welding Inspectors, level II or the level III requirements.

The inspector shall, prior to performing any inspections, have documented training on all applicable codes and specifications applicable to this specific Project for the inspections to be performed. This training shall include evidence that the inspector is competent with the Project specific specifications and requirements.

#### **2.26.5.7.14 Nonconforming Work**

***Nonconformance Report Identification.*** The CQA Manager shall identify and document in a nonconformance report (NCR) all elements of the Work that have not, or are believed to have not, been constructed in accordance with the approved Design Documents. The NCR shall be submitted to the Department in writing within 24 hours of identification, and a copy sent to the Engineer of Record.

***NCR Remediation.*** In the NCR, the CQA Manager shall clearly describe the element of Work that is nonconforming and the reason for nonconformance. The Engineer of Record (or a designated designer with equivalent experience and State registration) who signed and

stamped drawings for the Work shall evaluate and determine whether a nonconformance exists; and the effect of the nonconformance on performance, safety, durability, long-term maintenance, and the life of the item. Design-Builder shall document remedial actions and have them stamped by a Professional Engineer licensed in Washington State. The CQA Manager must also sign the NCR, stating that remedial actions to be employed have undergone the same level of inspection and testing as required for the original design.

**Removal of Work.** If the Department does not agree with the remedial actions set forth in an NCR, it has the authority to call for removal of the nonconforming Work.

**Biweekly NCR Reports.** The CQA Manager shall maintain a log of all NCRs and submit it biweekly to the Department. The CQA Manager shall number each NCR sequentially; give a brief description and status of the nonconforming Work, and, if the NCR has not been closed, an expected closure date. The Department will not grant acceptance for any portion of Work that has an outstanding NCR.

**Department NCR's and Audit Findings.** The Department shall retain the right to write its own NCRs and Audit Findings based on its observance of Work. Department-generated NCRs and Audit findings require the same review and ultimate closure as NCRs generated by the CQA Manager.

#### **2.26.5.7.15 Quality Checkpoints**

**General.** Design-Builder shall establish quality checkpoints (QCP) at certain stages of the construction process to ensure that only acceptable Work is incorporated into the Project. With the CQA Manager and the Department's oversight representative when the Department's representative elects to be present, Design-Builder shall review the progress of Work to date, including inspection reports, process and acceptance test reports, settlement data, pile driving records, string-line measurements, audits, and other pertinent data. The CQA Manager shall coordinate the review group members to ensure that the QCPs are reached in a timely fashion so that the Design-Builder is not delayed. When a QCP is reached, the Department's oversight representative shall respond within four (4) working hours of notification of embankment checkpoints and within 24 working hours of notification of all other QCPs, if the Department's representative elects to attend. Design-Builder shall provide necessary documents to determine the acceptability of Work, such as inspection reports, test reports, settlement data, etc. to all parties at the time of QCP notification. Design-Builder shall perform additional Work past the QCP until all parties present mutually agree that the Work up to that point is acceptable.

As a minimum, Design-Builder shall establish QCPs at the stages of construction listed below. The DQA Manager or CQA Manager shall identify any additional QCP's necessary to certify compliance. The following checkpoints are not intended to limit or diminish the Design-Builder's responsibility to inspect all construction Work.

#### **Embankments.**

- a. After completion of drainage and utility installations and before backfill
- b. At intervals of embankment construction of every 5 vertical feet (applicable to all embankments, including retaining walls)

***Structures.***

- a. At completion of bridge embankment and before the start of bridge foundation Work.
- b. Before beginning pile driving, pile driving submittals (including design calculations and WEAP analysis).
- c. After completion of pile-driving at each structure support (pile group) (including pile-driving results and records)
- d. Before concrete placement of any substructure element including pile infilling
- e. After girder and diaphragm placement
- f. Before concrete placement of deck, approach slabs, diaphragms, and parapet walls, but with forms, reinforcement, and inserts in place
- g. Before beginning construction of box culverts (to confirm subgrade materials)
- h. Before concrete placement for cast-in-place (CIP) box culverts, but with forms, reinforcement, and inserts in place.

***Surfacing and Paving.***

- a. Before placement of each course above subgrade on permanent roadways.
- b. Before placement of each roadway surfacing lift (including base courses, top courses, ATB, HMA, and PCCP) on permanent roadway components

***Retaining Walls***

- a. Before the placement of the leveling pad of a mechanically stabilized earth (MSE) wall or the foundation of any other type of retaining wall (to confirm subgrade materials and conditions).
- b. For single-stage MSE Walls with height of 25 feet or more, panel tolerances when the wall is three panels tall.
- c. Panel tolerances after completion of placement of panels for each MSE wall, prior to beginning coping placement.
- d. Before concrete placement for cast-in-place retaining walls - with forms, reinforcement, and inserts in place.

***Noise Walls.***

After completion of every 500 feet of noise wall, before proceeding with placement of more noise walls.

***Drainage***

After placement of pipe or box, before placement of backfill.

***Environmental Controls***

Before any construction occurs, other than to install BMP's and environmental controls, verify that all BMP's and environmental controls,

as designed by the Design-Builder's Environmental Compliance Manager, are installed according to design and RFP requirements.

#### **2.26.5.8 Environmental Compliance and Monitoring Requirements**

**General.** In Section 6 (Environmental Compliance and Monitoring) of the QMP, Design-Builder shall describe the methods, processes, and procedures to provide for the effective implementation and documentation of the environmental protection, training, compliance, and monitoring program.

See Section 2.8 for the environmental protection program requirements.

#### **2.26.5.9 Maintenance of Public Facilities Requirements**

**General.** In Section 7 (Maintenance of Public Facilities) of the QMP, Design-Builder shall specify procedures to follow in the maintenance of detours constructed on the Project; and for controlling noise, dust, and debris associated with the hauling operations using off-site haul roads. In such procedures, Design-Builder shall identify provisions to be implemented in providing safe and effective alternative routes for the public, as well as safe and convenient access to residences and businesses affected by construction activities.

#### **2.26.5.10 Survey Verification**

**General.** In Section 8 (Surveying) of the QMP, Design-Builder shall specify procedures to follow in verifying the Construction Surveying, Property Surveying, establishment of ROW markers, As-Built Plans, re-established County and Subdivision Monuments, and Record of Survey Map.

#### **2.26.5.11 Utilities**

In Section 9, Design-Builder shall describe processes to ensure Contract compliance for Utility Relocation done by the Design-Builder and the Utility Company.

### **2.27 MAINTENANCE DURING CONSTRUCTION**

#### **2.27.1 General**

The Design-Builder shall be responsible for the operations, maintenance and repairs to the existing facilities and facilities constructed under the Contract commencing from the day construction Work begins, and ending on the day of Physical Completion, at which time the Warranty requirements will govern such Work thereafter.

The only maintenance that will be performed by the WSDOT inside the Project limits will be snowplowing, applying deicing agents and/or abrasives on the roadways open to use by the general public, nuisance vegetation control and noxious weed control. See also Section titled

Snow and Ice Operations. See Appendix M8 – **Limits of Maintenance During Construction.**

The Design-Builder's maintenance obligations shall include routine maintenance, and inspections and repairs of the Work and the Site as required on an "as needed" basis throughout the life of the Agreement in a manner acceptable to WSDOT. WSDOT reserves the right to perform such Work, as it deems necessary with its own forces, and/or to enter into special contracts for the maintenance of specific items, and to deduct from monthly payments the dollar amount for any Work performed by WSDOT personnel, equipment or their agent.

The Design-Builder is responsible for maintenance and repairs when working on local street or crossings that are within the limited access (WSDOT Right Of Way). The Design-Builder is responsible for coordination of such maintenance and repair work with the City of Everett

Design-Builder shall perform the operations and maintenance aspect of the Work in a safe, reasonable, and prudent manner and shall employ good business practices and appropriate management techniques. Design-Builder shall furnish all labor, materials, equipment and necessary services (such as highway safety controls) required in the performance the operation, maintenance, and/or repair services.

## **2.27.2 Maintenance of the Right of Way**

### **2.27.2.1 General**

Design-Builder shall be responsible for maintenance of highway vegetation on the Site until Physical Completion. This responsibility includes nuisance vegetation control, noxious weed control, tree and brush control, turf and grass care.

### **2.27.2.2 Tree and Brush Control**

The Design-Builder shall be responsible for the removal or trimming of any tree(s) or brush that may obscure any roadway sign or cause a reduction in the sight distance. The WSDOT will identify and notify the Design-Builder of any tree(s) and brush that is appropriate for removal or trimming. The Design-Builder shall be responsible for the removal of any downed trees and or trees or shrubs identified by WSDOT as constituting a danger or hazard or may be a safety concern for public travel. Design-Builder shall remove any downed tree(s) from the Site within 24 hours.

### **2.27.2.3 Turf and Grass Care**

The Design-Builder shall mow existing turf or grasses from the edge of pavement to the outside limit of the Right of Way through the active construction area. The grass or turf shall be mowed when the average grass height reaches 30 inches to a height of no less than 6 inches but no higher than 12 inches. The Design-Builder shall not scalp the ground within sensitive areas. Mowing will not be required on slopes steeper than 2:1.

WSDOT maintenance will coordinate other routine turf and grass mowing operations within the construction zone, through the WSDOT Project office, but will not mow the areas maintained by the Design-Builder.

## **2.27.3 Maintenance of Roadways**

### **2.27.3.1 General**

Design-Builder shall complete all components of the Work required to allow for unrestricted traffic access to mainline lanes and shoulder prior to Substantial Completion. Any closure will be subject to the requirements of Section 2.20.

### **2.27.3.2 Roadway Sweeping**

Design-Builder shall abate dust nuisance by cleaning, sweeping, and sprinkling with water, or other means as necessary. The use of water resulting in mud on streets and paved areas will not be permitted as a substitute for sweeping or other methods. Design-Builder shall take necessary precautions to prevent spillage on haul routes, and shall remove any such spillage immediately and clean the affected area.

Design-Builder shall furnish and operate a self-loading motor sweeper with spray nozzles as necessary to keep paved areas acceptably clean wherever construction, including restoration, is incomplete.

Discharge of smoke, dust, or any other air contaminants into the atmosphere in such quantity as will violate applicable environmental laws or governmental approvals is a permit violation. The Design-Builder shall pay fines from such violations.

As construction is completed, Design-Builder shall on a daily basis:

- Clean and broom paved surfaces adjoining the Project.
- Rake and clean other surfaces of the Project Site.
- Shoulders of the traveled lanes through the construction zone shall be swept 1 time per each 24-hour period, or more frequently if required for dust abatement or water quality.
- The roadway and shoulders of the haul route, within the project limits on I-5 or within one mile of I-5 on US-2 or city streets, shall be swept once a week when the Design-Builder is hauling dirt or other construction debris from or within the construction area to a disposal or stockpile site.

Design-Builder shall adhere to the dust-control, erosion control, noise abatement and other Site procedures required by the Contract Documents

### **2.27.3.3 Existing Pavement**

The Design-Builder shall be responsible for maintaining all existing pavement including pothole repair. Any pothole greater than 36 square inches (i.e. 6"x 6") shall be repaired within 24 hours.

### **2.27.3.4 Roadway Debris**

Animal carcasses and other road debris that would present a traffic hazard, cause damage to vehicles, block one or more traffic lanes or cause traffic to slow below the posted speed limit shall be removed from the travel lanes by the Design-Builder with 1 hour of notification. The carcass or debris shall be removed from the Site and disposed of by proper means at an approved location.

Should Design-Builder shall failure to maintain the Site free from accumulation of waste and rubbish as set forth above or otherwise failure to comply with Site clean-up procedures required by the Contract Documents, and should such failure continue despite receipt of a 24 hour notice from WSDOT to undertake necessary clean-up, with diligence and promptness, WSDOT may immediately after expiration of such twenty-four (24) hour period, without prejudice to other remedies WSDOT may have, perform such work on Design-Builder's behalf. In such case, WSDOT shall deduct from payments then or thereafter due to Design-Builder, the cost incurred by WSDOT in performing such work, including administrative costs related thereto. If payments then or thereafter due are not sufficient to cover such amounts, Design-Builder shall pay the difference to WSDOT on demand.

### **2.27.3.5 Pavement Markings**

The Design-Builder will be responsible for maintaining existing and new striping within the Project limits until Final Acceptance. The Design-Builder shall refresh such Site striping as required by the WSDOT. Temporary Pavement Marking Paint shall be per WSDOT Standard Specification 9-34.2(4). Design-Builder should anticipate that at a minimum existing striping will need to be refreshed once per calendar year. All other pavement marking shall meet the requirements of Chapter 4 and 5 of Maintenance Accountability Process (MAP) Manual. See RFP Appendix Y.

### **2.27.3.6 Traffic Control Devices**

The Design-Builder shall be responsible for ensuring that fugitive traffic barrels, cones and other devices remain out of open traffic lanes. All traffic control devices, including but not limited to traffic barrels and cones, shall be placed behind barrier or placed off the shoulder of the roadway when not in use.

### **2.27.3.7 Guardrail, Concrete Barrier and Attenuators**

The Design-Builder shall be responsible repairing or replacing any guardrail, concrete barrier and attenuators that become damaged by the motoring public or by the Design-Builder's operations. Attenuators must be replaced in kind or if repairable must meet applicable

NCHRP standards. Payment for any guardrail, concrete barrier or attenuators damaged by the motoring public will be made on a force account basis in accordance with General Provisions Section 1-09.6.

#### **2.27.3.8 Traffic System Signs**

The maintenance of existing permanent signs shall be the responsibility of the Design-Builder. Signs such as Stop and Yield shall be replaced within one hour of notification. Maintenance of the permanent signs includes cleaning, repairing, replacing damaged signs and posts. Payment for repairing permanent signing damaged by the motoring public will be made on a force account basis in accordance with General Provisions Section 1-09.6.

#### **2.27.3.9 Drainage**

The Design-Builder is responsible for maintaining and providing adequate drainage on the Project until Physical Completion of the Project. Maintenance shall include the repair of riprap, cribbing, cleaning of ditches, channels, culverts, cross drains, drainage structures and gutters.

#### **2.27.3.10 Access to Public Facilities**

Design-Builder shall maintain uninterrupted access to all public facilities affected by the Project. Access shall mean providing a clear and easily understood route into and out of an existing facility or business. Design-Builder shall provide all necessary signing to convey that the route to the facility or business is open to traffic. WSDOT will determine whether the signing is adequate. Design-Builder shall provided access to such facilities for all types of vehicles, including trucks needed for deliveries.

### **2.27.4 Snow and Ice Operations**

#### **2.27.4.1 Public Travel Way**

WSDOT will perform snowplowing, application of deicer and/or abrasives for lanes of traffic open for public travel. The snowplowing will be done as part of the normal course of plowing the public roadways within the vicinity of the Project, and the WSDOT when plowing inside the Project limits will take no special measures. The Design-Builder shall be responsible for maintaining any channelization devices that may be displaced or damaged by plowing operations, and shall be responsible for removal of snow and or abrasives deposited on the shoulders through the Project limits.

#### **2.27.4.2 Work Zone**

The Design-Builder shall be responsible for the removal of any snow and ice necessary to allow for performance the Work. The Design-Builder shall not allow any snow and ice removal from its operations to be placed within the traffic lanes opened to the general public.

## **2.27.5 Electrical**

### **2.27.5.1 Signals**

The Design-Builder shall be responsible for maintenance of all traffic and pedestrian signal systems until Physical Completion of the Project or until the new signal systems are in place, whichever is earlier. This maintenance and operations obligation shall include, but not be limited to, the following:

1. Replacement of lamps, as required.
2. Replacement or repair of any damaged equipment or underground cable.
3. Maintenance concerning a public safety issue (including exposed wires and knockdowns), within 1 hour of notice.

Payment for repairing existing signals damaged by the motoring public will be made on a force account basis in accordance with General Provisions Section 1-09.6.

In the event of that the existing signal system is damaged to the point that it no longer functions the Design-Builder shall advise WSDOT Design-Builder shall assist in the repair of the signal system, and shall provide sufficient written notice to allow WSDOT to have a representative present when the signal is turned on.

### **2.27.5.2 ITS:**

The Design-Builder shall be responsible to provide maintenance and operation of furnished and installed highway ITS component equipment as part of this Project until one year after the date of ITS Acceptance unless otherwise noted.

Design-Builder shall maintenance and operation obligations includes the response to faults in the ITS system. Such faults fall into three categories: urgent, priority, and minor, as follows:

- Urgent: Any fault that causes a total failure, disruption, or system-wide disruption of the following equipment or services:
  - TSMC computer equipment
  - Communications links and equipment
  - Central database, logging, and dissemination facilities
  - Ramp metering facility or CCTV facility
- The response time for urgent faults of ITS components shall be less than four hours. The repair time for urgent faults of ITS components shall be less than four hours.
- Priority: Any fault causes a failure or disruption of an operator workstation, local control unit for DMS, or the DMS itself. The response time shall be by noon the next calendar day. The repair time shall be less than four hours.
- Minor: Any other fault. The response time shall be by midnight of the next calendar day. The repair time shall be less than four hours.

The Design-Builder shall supply as part of the Work a written description for providing maintenance and operation of furnished and installed ITS components. The description shall include, at a minimum, the following:

- For each highway ITS component, a general description of the proposed emergency maintenance/operation response program. This description shall include the categories of faults and how the faults will be detected.

As of Notice to Proceed, the Design-Builder shall be responsible for any and all highway ITS/communications components that the Design-Builder works on, including those components already in place. These responsibilities include the operation and maintenance of these components until one year following ITS Acceptance.

### **Maintenance Response**

The Design-Builder shall respond to a reported non-operable component, not safety related, within 24 hours of notification of the problem. In order to determine response time, the Design-Builder will be notified by the Department by telephone, fax, or e-mail that there is a problem. The date and time of the telephone call, the transmitting fax machine's log, or the e-mail delivery date/time stamp shall be considered the date and time when the Design-Builder was notified of the problem. The Design-Builder shall return the component to working condition within 48 hours of notification of the problem.

In the case of problems affecting entire subsystems (i.e., all detection, all video, all devices in a specific area), the Design-Builder shall respond within 24 hours of problem notification and shall work continuously until the problem has been corrected.

In the case of problems affecting the communications backbone to the TSMC (i.e., all systems), the Design-Builder shall respond within 2 hours of problem notification and shall work continuously until the problem has been corrected.

If a problem is not corrected within 48 hours of notification, the Design-Builder shall provide the Department with a written description of the problem, efforts to fix the problem to date, anticipated course of corrective action, and anticipated schedule for completion of such corrective action.

The Design-Builder shall replace – not repair – a piece of hardware or equipment if any of the following occurs:

- The Design-Builder has attempted to repair the piece of hardware or equipment on at least one previous occasion and there has been a subsequent failure.
- The repair activities interfere with the movement of traffic and/or WSDOT decides that replacement is necessary in the interest of public safety.

### **Maintenance Log**

The Design-Builder shall maintain a log of all response maintenance and repair activities

performed during the performance of Work by the Design-Builder. The log shall be kept in a spreadsheet or other Department-approved software and include, at a minimum, the following information:

1. Date and time problem reported.
2. Entity reporting the problem.
3. Description of the reported problem.
4. Arrival time at the Site of the reported problem.
5. Technician performing repair or replacement.
6. Corrective actions taken.
7. Model and serial number of any component repaired or replaced.
8. Date and time problem rectified.

### **2.27.5.3 Luminaires**

The Design-Builder shall be responsible for maintenance and operation of all lighting systems until Final Acceptance. Maintenance and operation will include, but not be limited to, the following:

1. Replacement of lamps, as required.
2. Replacement or repair of any damaged equipment or underground cable.
3. Maintenance concerning a public safety issue (including exposed wires and knockdowns), within 1 hour of notice.
4. Routine maintenance and other maintenance not of a public safety nature, within 24 hours of notice.
5. Payment for repairing damaged permanent luminaries by the motoring public will be in accordance with Section 2.4.4.
6. WSDOT will pay for electric utility cost for public lighting.

### **2.27.5.4 Maintenance of Existing Vehicle Detection Loops**

With the exception of the existing vehicle detection equipment at SB I-5 MP 193.3 and between SB I-5 MP 189.10 to 189.23, the Design Builder may disconnect all vehicle detection loops as early as Notice to Proceed, and shall disconnect them not later than the date of the first traffic switch.

The Design-Builder shall protect and maintain the operation of the existing vehicle detection equipment at SB I-5 MP 193.3 and between SB I-5 MP 189.10 to 189.23 for the duration of the contract. If the Design-Builder grinds the pavement over these loops, Design-Builder shall replace the loops.

Any vehicle detection loop on SR-2 ramps damaged during Project work shall be replaced by the Design-Builder.

### **2.27.5.5 Maintenance of Existing Weigh-In Motion Equipment**

The Design-Builder shall protect and maintain the operation of the existing weigh-in motion equipment at SB I-5 MP 189.20 for the duration of the contract.

## **2.27.6 Hazardous Spills Response**

### **2.27.6.1 Public Travel Way**

Clean-up hazardous spills within the lanes of traffic open to the general public shall be the responsibility of WSDOT and the Department of Ecology. The Design-Builder shall allow authorized individuals access to the Site in order to respond to and remediate any spill. The Design-Builder shall make personnel and equipment available to respond to all emergencies, except when such emergency is life-threatening to the personnel.

### **2.27.6.2 Work Zone**

Any hazardous spills within the Design-Builder's Work Zone outside of public traveled way shall be the responsibility of the Design-Builder. The Design-Builder shall immediately upon the occurrence of any release of Hazardous Materials that may endanger the general public, that may require closure of any traffic lanes, and/or that may require any evacuation of nearby residences or businesses notify WSDOT and any other government agency required to be notified under Applicable Law.

## **2.27.7 Section Not Used**

## **2.27.8 Structures**

### **2.27.8.1 Existing Bridges**

The Design-Builder shall be responsible for repair and maintenance of all bridge expansion joints, bridge deck surface, bridge railing and drainage structures on and off the bridges within the Project limits. Design-Builder shall be responsible for maintaining free drainage of water through any drainage structure.

## **2.27.9 Maintenance of Property**

### **2.27.9.1 General**

The Design-Builder shall at all times preserve public and private property affected by the Project. The Design-Builder shall witness or reference land monument and property marker locations through the use of a registered land surveyor before moving, disturbing or damaging such property.

The Design-Builder shall be responsible for damage or injury to public or private property resulting from any act, omission, neglect, or misconduct in the method of executing the Work.

The Design-Builder shall restore any damaged or injured property to a condition similar or equal to that existing before the damage or injury occurred. The repairing, restoring, rebuilding, or making good such damage or injury shall be at no additional cost to WSDOT.

## **2.27.10 Maintenance of Aesthetic Treatment**

### **2.27.10.1 General**

The Design-Builder shall monitor the appearance of the aesthetic treatments on any walls or bridges for any defects, flaws, or vandalism during the construction period. The Design-Builder shall note and bring to WSDOT's attention any defects, flaws, or vandalism on such aesthetic treatments. From Notice to Proceed until Final Acceptance, the Design-Builder shall within 24 hours of notification by WSDOT, remove all graffiti on State owned structures on the Site.

The use of paint and/or permanent marking of any type on permanent features including barriers, railings and walls are prohibited.

The Design-Builder shall be responsible for cleaning up vandalism on the Project until Final Acceptance.

## **2.28 SECTION NOT USED**

## **2.29 SECTION NOT USED**

## **2.30 WARRANTIES**

### **2.30.1 Warranty Bond**

Design-Builder shall provide a warranty bond commencing on the day of Physical Completion, and ending with whichever of the following occurs last:

- (1) The end of the Warranty, or
- (2) The end of the Pavement Warranty, or
- (3) The end of the Roadside Restoration Warranty

The Warranty Bond shall be in the amount of 10% of the Contract Price, covering all of the Work described in Section 2.30.

### **2.30.2 General Warranty**

Design-Builder warrants that:

- (a) All design Work performed, and Design Documents prepared, pursuant to the Contract Documents, including that done by its Subcontractors and manufacturers, shall conform to

the generally accepted standards of care for professional engineering in the State of Washington;

(b) The Project shall be free of defects, including design errors, omissions, inconsistencies and other defects;

(c) Materials and equipment furnished under the Contract Documents shall be of good quality and, when installed, shall be new;

(d) The Work shall meet all of the requirements of the Contract Documents;

(e) The specifications and/or drawings contained within the Design Documents and the Released for Construction Documents are appropriate for their intended use; and

(f) The Project shall be fit for use for its intended function.

#### **2.30.2.1 General Warranty – Time of General Warranty**

The General Warranty shall commence upon Physical Completion. The General Warranty shall remain in effect until two years after the date of Physical Completion. If the Department determines that any of the Work has not met the standards set forth in this Section at any time during the warranty period for such Work, then the Design-Builder shall correct such Work as specified below even if the performance of such correction Work extends beyond the stated warranty period. Within seven days of receipt by the Design-Builder of notice from the Department specifying a failure of any of the Work to satisfy the Contract Documents, the Design-Builder and the Department shall mutually agree when and how the Design-Builder shall remedy such defective or non-compliant Work, provided, however, that in case of an emergency requiring immediate remedial action, the Design-Builder shall implement such action as it deems necessary and shall notify the Department of the urgency of a decision. The Design-Builder and the Department shall agree on a remedy immediately upon notice by or to the Department of such emergency. If the Design-Builder does not use its best efforts to proceed to effectuate such remedy within the agreed time, or if the Design-Builder and the Department fail to reach such an agreement within such seven-day period (or immediately, in the case of emergency conditions), then the Department, upon notice to the Design-Builder, shall have the right to order the Design-Builder to perform the Work or to perform or have performed by third parties the necessary Department-approved remedy, and the costs thereof shall be borne by the Design-Builder.

#### **2.30.2.2 General Warranty - Subcontractor Warranties**

Without in any way derogating the Design-Builder's own representations, Warranties, and other obligations with respect to all of the Work, the Design-Builder shall obtain from all Subcontractors and cause to be extended to the Department appropriate representations,

warranties, guarantees, and obligations with respect to design, material, workmanship, equipment, tools, and supplies furnished by such Subcontractors. All representations, warranties, guarantees, and obligations of Subcontractors shall be written so as to remain in effect despite any Department and Design-Builder Inspections, tests, and approvals, and shall run directly to and be enforceable by the Design-Builder and/or the Department and their respective successors and assigns.

#### **2.30.2.3 General Warranty - Performance Responsibility**

The Design-Builder retains responsibility for all Work performed on the Project, including all Work of Subcontractors and all materials and equipment provided by suppliers, vendors and/or manufacturers. Upon receipt from the Department of notice of a failure of any of the Work to satisfy any Subcontractor warranty, representation, covenant, guarantee, or obligation, the Design-Builder shall be responsible for enforcing or performing any such representation, warranty, guarantee, or obligation, in addition to the Design-Builder's other obligations hereunder. The Department's rights under this Section shall commence at the time such representation, warranty, guarantee, or obligation is furnished and shall continue until the expiration of the Design-Builder's relevant warranty (including extensions for Work repaired or replaced during the warranty period). Until such expiration, the cost of any equipment, material, labor (including re-engineering), and/or shipping shall be for the account of the Design-Builder if such cost is covered by Design-Builder's warranty obligations, and the Design-Builder shall be required to replace or repair defective equipment, material, or workmanship furnished by Subcontractors.

#### **2.30.2.4 General Warranty – Extension of General Warranty**

The Design-Builder's Warranties shall apply to all Work repaired or replaced pursuant to the terms of this Contract. The Design-Builder's Warranty for repaired or replaced elements of the Work shall extend beyond the original Warranty period as necessary to provide a two-year Warranty period following acceptance for any such repaired or replaced Work.

#### **2.30.2.5 General Warranty – No Limitations of Liability**

The foregoing Warranties are in addition to all rights and remedies available under the Contract Documents or a Applicable Law, and shall not limit the Design-Builder's liability or responsibility imposed by the Contract Documents or applicable law with respect to the Work, including liability for design defects, latent construction defects, strict liability, negligence, or fraud.

#### **2.30.2.6 Damages For Breach Of Warranty**

In addition to all rights and remedies available under the Contract Documents or Applicable Law, if the Design-Builder fails or refuses to perform warranty work as provided in this Section despite a valid request from WSDOT to do so, the Design-Builder shall be liable for

the cost of performance of the Warranty Work by others. The Department may also draw upon the Warranty Bond.

#### **2.30.2.7 Exclusions**

The Warranties shall not require the Design-Builder to repair or replace Work if the need for the repairs or replacement is caused by the following:

- A) Normal wear and tear, provided that damage and/or deterioration outside allowable limits specified in Contract Documents shall not be considered normal wear and tear;
- B) Failure to perform routine maintenance consistent with policies and/or procedures established by the Department or other maintenance agencies, including Utility Owners, or in the absence of such policies and/or procedures in accordance with industry standards of maintenance for similar Projects in the United States;
- C) Rebellion, war, riot, act of sabotage, civil commotion, or acts of vandalism;
- D) Wind, flood, and/or earthquakes and other acts of God.
- E) Spill or release of hazardous or contaminated substances not caused by the Design-Builder's organization; and/or

#### **2.30.2.8 Warranty Inspections**

The Department and the Design-Builder shall conduct joint annual warranty Inspections of the Project commencing one year after Physical Completion. A semi-final warranty inspection shall also be conducted six months prior to the end of the warranty period. The measurements and/or tests for those warranty items that require specific measurements shall be taken during the scheduled joint inspections. Notwithstanding the provisions of this Section, the Department may inspect any component of the Project at any time and issue notice to Design-Builder to perform remedial Work. The failure to conduct any inspection specified herein shall not invalidate or cancel the warranty provisions, responsibilities or performance requirements.

#### **2.30.2.9 Warranty Performance Requirements**

In addition to the Warranty provisions of this Section, Project components shall meet the specific performance requirements specified in the Contract Documents.

#### **2.30.2.10 Costs of Correction of Work**

All costs of correcting rejected Work, including additional testing and inspections, shall be deemed included in the Contract Price. Design-Builder shall reimburse WSDOT and pay WSDOT's expenses made necessary thereby within ten days after Design-Builder's receipt of invoice therefore.

### 2.30.2.11 Damages for Breach of Warranty

If Design-Builder fails or refuses to comply with its warranty obligations described in Section 2.30.2.3, notwithstanding a valid request by WSDOT, Design-Builder shall be liable for the cost of performance of the warranty work by others.

### 2.30.2.12 Disputes

Any disagreement between WSDOT and Design-Builder relating to this Section shall be subject to the dispute resolution provisions of the General Provisions, provided that Design-Builder shall proceed as directed by WSDOT pending resolution of the dispute.

## 2.30.3 Pavement Warranty

The Design-Builder shall be responsible for the pavement performance and Warranty Work for a period of three (3) years following Substantial Completion of the Project.

The extent of Warranty Work and the Design-Builder's liability for the Work that may be required by these warranty provisions is not limited by the Warranty Bond amount.

### 2.30.3.1 Mandatory Standards

**Conflicts and Priority.** If there is any conflict in Mandatory Standards, Design-Builder shall adhere to the Mandatory Standard with the highest priority. However, if the Design-Builder's Proposal has a higher standard than all of the listed Mandatory Standards, Design-Builder shall adhere to that higher standard identified in Design-Builder's Proposal.

**Ambiguity.** If there is any unresolved ambiguity in the Mandatory Standards, Design-Builder shall obtain clarification from the Department before proceeding with design or construction.

**Version and Date.** Design-Builder shall use the most current version of each listed standard as of the initial publication date of the Contract unless modified by Addendum or Change Order.

**Table 2.30.1**  
**Mandatory Standards for Pavement Warranty**

Priority	Author or Agency	Title	Document or Report No.	Date	Comments, Short Forms
1**	Design-Builder	<i>Proposal for I-5 Everett HOV Design-Build Project</i>	n/a		Proposal
2	SHRP	<i>Distress Identification Manual for Long-Term Pavement Performance Project</i>	SHRP-P-338		n/a
** Only to the extent the Proposal requirements exceed the requirements of all other listed Mandatory Standards.					

### 2.30.3.2 Performance Requirements - All Pavements

The parameters that will be used by WSDOT to evaluate performance of all constructed pavements for this Project are ride quality, pavement friction, pavement surface condition, structural capacity and material quality. These parameters will be measured and evaluated by WSDOT on an as needed basis during the warranty period.

At least 60 days prior to the expiration of the warranty or at any time deemed necessary by the Engineer, the Engineer will notify the Design-Builder in writing if the pavement distress exceeds the criteria outlined in Tables 2 through 4, as applicable. The Design-Builder will not be held responsible for distresses that are caused by factors beyond the control of the Design-Builder. A finding that the distress is due to factors outside the control of the Design-Builder shall be based on evidence submitted by the Design-Builder to the WSDOT Engineer. If the Engineer does not agree with the Design-Builder then the Dispute Resolution provisions as outlined in General Provisions Section 1-04.5 will be followed. Within 45 days of receiving notice, the Design-Builder shall commence to undertake the Warranty Work, submit a plan for completing the Work within the following nine months, and/or provide written objection if the need for Warranty Work is contested. Disagreement between the Design-Builder and the Engineer shall be resolved in accordance with the dispute resolution provisions as outlined in General Provisions Section 1-04.5. If the Design-Builder fails to undertake Warranty Work within 45 days after receiving written notice from the WSDOT Engineer or Dispute Resolution Team, WSDOT will complete the Warranty Work or Contract to have it completed and the Design-Builder shall be responsible for the total cost of the Warranty Work.

Coring, milling, or other destructive procedures may not be performed by the Design-Builder, without prior consent of the WSDOT Engineer. The Design-Builder will not be responsible for damages as a result of coring, milling or other destructive procedures conducted by WSDOT, utility companies or other entities not under the control of the Design-Builder.

All repair, maintenance, and warranty work performed as part of this warranty provision, except as excluded elsewhere in this provision, shall be covered by the warranty provision for the remainder of the warranty term.

During the warranty period, the Warranty Work shall be performed at no cost to WSDOT. Maintenance (elective and preventative action) Work that the Design-Builder elects to perform during the warranty period shall be at no cost to WSDOT. If corrective action needs to be taken, the Design-Builder shall coordinate all such activities to minimize disruption to the traffic, with prior approval of WSDOT.

Maintenance or warranty work that requires resurfacing of the pavement shall not be performed later than October 1 without written approval from the Department. In addition, hot mix asphalt (HMA) shall not be placed on any wet surface, or when the average surface temperatures are less than those specified in Table 1, below, or when weather conditions otherwise prevent the proper handling or finishing of the bituminous mixtures:

<b>Table 1 HMA Placement</b>		
Compacted Thickness (ft)	Surface Course Temperature	Sub-Surface Course Temperature
Less than 0.10	55°F	55°F

0.10 to 0.20	45°F	35°F
0.21 to 0.35	35°F	35°F
More than 0.35	DNA	25°F*

- Only on dry subgrade, not frozen and when air temperature is rising.

### 2.30.3.3 Performance Requirements - Hot Mix Asphalt

#### 2.30.3.3.1 Ride Quality

Ride quality, determined by the International Ride Index (IRI) will be evaluated using WSDOT's South Dakota Type Profiler, and as follows:

The IRI will be determined after the completion of paving, but not later than Substantial Completion. The Design-Builder will provide corrective action for any IRI values more than 95 inches per mile.

The ride quality value for new HMA pavement sections at the end of three (3) years following Substantial Completion shall not exceed an IRI value of 95 inches per mile. No Incentive/Disincentive payments will be made as the result of this pavement smoothness evaluation.

If this criterion is not met, the Design-Builder shall take corrective action as indicated above.

#### 2.30.3.3.2 Pavement Friction

Pavement friction shall meet the following performance criteria:

- A. The friction value at the end of three (3) years after Substantial Completion shall be no less than 40. Pavements with a friction number less than 40 will require corrective action by the Design-Builder within six months.
- B. If at any time during said three (3)-year period WSDOT determines, in accordance with ASTM E274-90, that this criterion is not met, upon receipt of notice to such effect from WSDOT, the Design-Builder shall take corrective action to provide values that meet or exceed 40, within six months after receipt of the notice.

#### 2.30.3.3.3 Pavement Surface Condition

Pavement surface condition shall meet the following performance criteria:

- A. Final Acceptance will not be provided by WSDOT if the pavement surface contains identifiable distress as defined by the WSDOT Pavement Surface Condition Rating Manual. If such criteria are not met, the Design-Builder shall take corrective action as outlined in Table 2.

- B. Distress types exceeding the allowable level of severity at the end of three (3) years after Substantial Completion shall require corrective action by Design-Builder as outlined in Table 2.

#### 2.30.3.3.4 Structural Capacity

The structural capacity (thickness, strength) of pavement sections shall be evaluated during the construction phase through the Design-Builder's approved Quality Management Plan. The parameters that will be evaluated include thickness, strength, and quality of materials. The strength, thickness, and quality of materials will be evaluated to ensure compliance with the approved design.

The requirements for final acceptance shall be to meet or exceed the design criteria. If the structural capacity is determined to be deficient by WSDOT, the Design-Builder shall take corrective action to rectify the deficiency.

#### 2.30.3.3.5 Material Quality

Material quality shall be evaluated prior to and during construction through the Design-Builder's approved Quality Management Plan. Materials specified in the Design Documents shall meet the requirements outlined in the WSDOT Standard Specifications. Materials not meeting the requirements of the Standard Specifications shall be removed immediately and replaced with acceptable material.

#### 2.30.3.3.6 Required Corrective Actions

**TABLE 2. Hot Mix Asphalt Pavements**

Distress Type	Allowable Level of Severity	Allowable Extent of Severity	Corrective Action
Rutting and Wear	Less ¼ inch average	No individual 100 lane-foot section greater than ¾ inch	Mill and fill with 0.15 feet of HMA pavement full lane width
Alligator Cracking	Less than ¼ inch in width	Less than 0.1 percent of total pavement surface	Pavement repair
Longitudinal Cracking	Less ¼ inch in width	Less than 1 percent of the Project length	Crack sealing
Transverse Cracking	Less ¼ inch in width	Less than 1 one crack per 2000 lane-feet	Crack sealing
Systematic Density Defects	0 percent detected	None	Mill and fill with 0.15 feet of HMA pavement full lane width

#### 2.30.3.4 Performance Requirements - Portland Cement Concrete Pavement

##### 2.30.3.4.1 Ride Quality

Ride quality, determined by the International Ride Index (IRI), will be evaluated using WSDOT's South Dakota Type Profiler, and as follows:

The requirement for Initial Acceptance will be an IRI value of less than 75 inches per mile on new and existing cement concrete pavement, evaluated as early as initial placement but not later than Substantial Completion. If the IRI value exceeds 95 inches per mile, the Design-Builder shall provide corrective action to reduce the IRI value. The Design-Builder shall diamond grind the profile back to acceptable limits provided the area requiring grinding does not exceed five per cent of the surface area of a days production and does not reduce the section thickness by more than five per cent. If these limits are exceeded, the Design-Builder shall replace the defective pavement for the full lane width over the section at the Design-Builders expense.

The IRI value on the new PCCP at the end of three (3) years following Substantial Completion shall not exceed 90 inches per mile. No Incentive/Disincentive payments will be made as a result of this pavement smoothness evaluation. If this criterion is not met, the Design-Builder shall take corrective action as indicated above to bring this parameter within the limits. Existing PCCP is exempt from this requirement.

#### **2.30.3.4.2 Pavement Friction**

Pavement friction shall meet the following performance criteria:

- a. The friction value at the end of three (3) years after Final Acceptance shall be no less than 40. Pavements with a friction number less than 40 will require corrective action within six months.
- b. If at any time during said three (3)-year period WSDOT determines, in accordance with ASTM E274-90, that this criterion is not met, the Design-Builder shall take corrective action upon receipt of notice to such effort from WSDOT so as to provide values that meet or exceed 40, within six months after receipt of the notice.

#### **2.30.3.4.3 Pavement Surface Condition**

Pavement shall meet the following performance criteria:

- Final acceptance will not be provided by WSDOT if the pavement surface contains identifiable distress as defined by the WSDOT Pavement Surface Condition Rating Manual. If such criterion is not met, the Design-Builder shall take corrective action as outlined in Table 3 or 4.
- Distress types exceeding the allowable level of severity at the end of three (3) years after Substantial Completion shall require Design-Builder to undertake corrective action as outlined in Table 3 or 4.

#### **2.30.3.4.4 Structural Capacity**

The structural capacity (thickness, strength) of pavement sections shall be evaluated during

the construction phase through the Design-Builder's approved Quality Management Plan. The parameters that will be evaluated include thickness, strength, and quality of materials. Load transfer capacity (> 90%) of new concrete pavements will be verified to comply with design assumptions. The strength, thickness, and quality of materials will be evaluated to ensure compliance with the approved Design Documents.

The requirements for Final Acceptance shall be to meet or exceed the design criteria. If the structural capacity is determined to be deficient by WSDOT, the Design-Builder shall take corrective action to rectify the deficiency.

### 2.30.3.4.5 Material Quality

Material quality shall be evaluated prior to and during construction through the Design-Builder's approved Quality Management Plan. Materials specified in the Design Documents and the Released for Construction Documents shall meet the requirements outlined in the WSDOT Standard Specifications. Materials not meeting the requirements of the Standard Specifications shall be removed immediately and replaced with acceptable material. WSDOT verification testing shall in no way relieve the Design-Builder of responsibility under this warranty.

### 2.30.3.4.6 Required Corrective Actions

**TABLE 3. New Concrete Pavement**

Distress Type	Allowable Level of Severity	Allowable Extent of Severity	Corrective Action
Cracking	One crack per panel	Less than 0.1 percent of panels	Full depth slab replacement
Faulting	None	None	Full depth slab replacement
Wear	Less than 1/8 inch	Less than ten percent of one lane mile	Diamond grinding back to zero tolerance without compromising pavement section. If the structural integrity of the pavement section is compromised, full depth slab replacement
Joint Seal Damage	Hardening, adhesive failure, cohesive failure, complete loss of sealant	Less than two percent of joint length per lane mile	Reseal joint

**TABLE 4. Dowel Bar Retrofit of Existing Concrete Pavement**

Distress Type	Allowable Level of Severity	Allowable Extent of Severity	Corrective Action
Cracking within dowel bar slot	None	None	Replace pour back material and dowel bar
Wear within dowel bar slot	None	None	Partial depth repair of dowel bar slot
Bond failure within slot	None	None	Replace pour back material and dowel bar
Faulting	None	None	Full depth panel

			replacement of slabs on both side of faulted joint
Spalling within dowel bar slot	None	None	Partial depth repair of dowel bar slot
Joint seal damage	Hardening, adhesive failure, cohesive failure, complete loss of sealant	Less than two percent of joint length per lane mile	Reseal joint

## 2.30.4 Warranty for Roadside Restoration

### 2.30.4.1 Community Enhancement Areas:

#### 2.30.4.1.1 First year after planting:

100% of the plants shall be alive, healthy, and vigorously growing.

All dead, dying or unhealthy plants shall be replaced.

Planting areas shall be free of plants other than those that have been planted or seeded.

#### 2.30.4.1.2 Second and Third years:

100% of trees shall be alive, healthy, and vigorously growing.

90% of shrubs and groundcovers area shall be alive, healthy, vigorously growing, and provide masses with coverage that does not have openings of more than 2 plants.

Planting areas shall be free of plants other than those that have been planted or seeded.

### 2.30.4.2 Roadside:

#### 2.30.4.2.1 First year after planting:

100% of the plants shall be alive, healthy, and vigorously growing.

All dead, dying or unhealthy plants shall be replaced.

Planting areas shall be free of plants other than those that have been planted or seeded.

#### 2.30.4.2.2 Second and Third years:

90% of trees shall be alive, healthy, and vigorously growing.

80% of shrubs shall be alive, healthy, vigorously growing and provide masses with coverage that does not have openings of more than 4 plants.

Planting areas shall be free of noxious weeds in accordance with Section 8-02.3(2)B.

Planting areas shall be free of invasive weeds including Reed Canarygrass (*Phalaris arundinacea*), Purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus discolor*) and Evergreen blackberry (*Rubus laciniatus*), Scotch broom (*Cytisus scoparius*), Hedge bindweed (*Calystegia sepium*), Giant hogweed (*Heracleum Mantegazzianum*), Canada thistle (*Cirsium arvense*), Butterfly bush (*Buddleia spp.*), Common reed (*Phragmites australis*) and

Japanese knotweed (*Polygonum cuspidatum*), Red Alder (*Alnus rubra*), Black Cottonwood (*Populus nigra*), Bigleaf Maple (*Acer macrophylla*), English Ivy (*Hedera* sp.) and other invasive and competitive vegetation.

#### **2.30.4.3 Environmental Mitigation Areas:**

##### **2.30.4.3.1 First year after planting:**

100% of the plants shall be alive, healthy, and vigorously growing.

All dead, dying or unhealthy plants shall be replaced.

Planting areas shall be free of plants other than those that have been planted or seeded.

##### **2.30.4.3.2 Second and Third Year:**

100% of trees and shrubs shall be alive, healthy, and vigorously growing. Planting areas shall be free of noxious weeds in accordance with Section 8-02.3(2)B. Planting areas shall be free of invasive weeds including Reed Canarygrass (*Phalaris arundinacea*), Purple loosestrife (*Lythrum salicaria*), Himalayan blackberry (*Rubus discolor*) and Evergreen blackberry (*Rubus laciniatus*), Scotch broom (*Cytisus scoparius*), Hedge bindweed (*Calystegia sepium*), Giant hogweed (*Heracleum Mantegazzianum*), Canada thistle (*Cirsium arvense*), Butterfly bush (*Buddleia* spp.), Common reed (*Phragmites australis*) and Japanese knotweed (*Polygonum cuspidatum*), English Ivy (*Hedera* sp.) and other invasive and competitive vegetation. Any native volunteer plant species shall be saved and protected.